

0012368

SINGLE-SHELL TANK WASTE CHARACTERIZATION FOR TANK 241-U-110 CORE 12  
SEGMENT 234

DATA PACKAGE

# SECTION

6 OF 10



Westinghouse  
Hanford Company

6 of 10

P.O. Box 1970 Richland, WA 99352

## 222-S/RCRA Analytical Laboratories

Project: Single-Shell Tank Waste  
Characterization

Tank: 241-U-110

Core: 12

Segment: 4

Customer Id. Number:  
89-072

Report Revision: 1

Date Printed: October 5, 1990



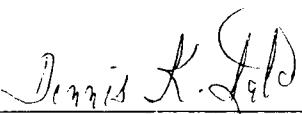
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This report consists of pages 1 through 171.  
Appendix A consists of pages A-1 through A-42.  
Appendix B consists of pages B-1 through B-3.

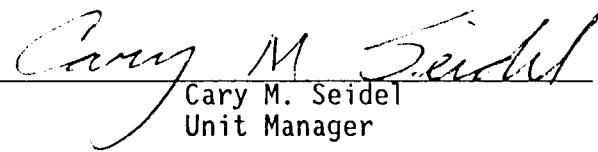
I have reviewed this report and certify that the package is in compliance with "Quality Assurance Project Plan for the Chemical Analysis of Highly Radioactive Samples in Support of Environmental Activities on the Hanford Site" - WHC-SD-CP-QAPP-002. I found it to be a true and accurate accounting both technically and for completeness of the laboratory analyses performed on this sample.



Dennis K. Sato  
Data Coordinator

Date

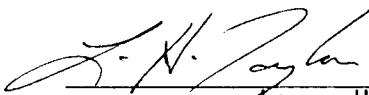
October 15, 1990



Cary M. Seidel  
Unit Manager

Date

October 15, 1990



Larry H. Taylor  
Laboratory Q.A. Officer

Date

October 23, 1990

## **INTRODUCTION**

## INTRODUCTION

Westinghouse Hanford Company Analytical Laboratories are supporting the characterization efforts of the single shell tanks. The characterization of tank 241-U-110 was performed under Phase 1A and 1B of the "Waste Characterization Plan for the Hanford Site Single-Shelled Tanks" (WHC-EP-0210).

Tank 241-U-110 has a 500,000 gallon capacity. Construction was completed in 1944. The tank received first cycle waste, REDOX high-level waste, coating waste, and laboratory waste until 1975. Between July 7, 1975 and February 2, 1976, P-10 pumps were installed, and 41,700 gallons of liquid waste were pumped from the tank. Tank 241-U-110 still contains an estimated 195,000 gallons of waste.

Analytical Laboratories performs all analytical analysis to the specifications of the "Quality Assurance Project Plan for the Chemical Analysis of Highly Radioactive Samples in Support of Environmental Activities on the Hanford Site", WHC-SD-CP-QAPP-002. In accordance with WHC-SD-CP-QAPP-002, the following laboratory policies are being followed. Spikes are performed on either the undissolved sample, or the sample after dissolution, as directed by the chemist. If the spike addition is found to be less than 20% of an analyte concentration, the spike recovery is not reported due to errors introduced by the precision of the sample analysis. The concentration of spike additions will be re-evaluated before the start of phase 1C. Two spiking routines are being used during phase 1A and 1B. For the following analyses, Ion Chromatography, Inductively Coupled Plasma, Mercury Hydride, Total Organic Carbon, and Carbonate analyses the solid sample is spiked independently from the sample digestion. Any non-homogeneity of the sample could adversely affect the spike recoveries. For the radio-isotopic analysis and other analyses not specified above, the spikes were performed by spiking an aliquot of sample after digestion.

The laboratory does not report sample results from batch analyses that are questionable. The results from questionable batches are discarded and the analysis is repeated. Sample cards (laboratory travelers) for the repeated analysis are reissued for analysis after they have been stamped "rerun". Laboratory travelers are issued using a computerized routine according to a "sample point". This sample point label (segment-n) on the Laboratory travelers and on the GEA analysis reports has no relationship to the sampling activities or the sample identification. All results in this data package relate only to the sample identified as segment 4 from core 12 taken from tank 241-U-110.

The organic analysis of this sample will be performed by Pacific Northwest Laboratories (PNL). Due to instrument and procedure problems, PNL has been unable to separate organics from the normal paraffin hydrocarbon present in the samples. The results from the organic analysis will be provided when available.

All sample results reported here by weight are reported as the "wet weight" of the sample. Some samples did noticeably lose moisture during the process of aliquoting and weighing the sample for digestion. In order to minimize errors due to loss of moisture, the percent moisture was determined at the earliest

opportunity. Attempts to dry the sample before analysis resulted in approximately a ten fold increase in radiation levels. In order to reduce and control radiation exposure to laboratory personnel, the samples were not dried before aliquoting and digestion. This may result in some laboratory results being biased high.

This report is formatted into sections corresponding to the type of dissolutions performed prior to analysis. A brief summary of analytical results is reported, followed by calibration data and an analysis are noted on the batch report. Any notable observations regarding an analysis are noted on the batch report for that analysis. Copies of laboratory travelers can be found in Appendix A.

## **SAMPLING AND CUSTODY DATA**

## CHAIN-OF-CUSTODY RECORD FOR CORE SAMPLING

(1) Shipment Number S-032-89 (2) Sample Number 89-072 (3) Supervisor DCHartley  
 (4) Tank 1104 (5) Riser R2 (6) Segment 4 (7) Cask Serial Number C1022

Radiation Survey Data:		(8) FIELD <u>10.5 Mr/hr.</u>	(20) LABORATORY <u>10Mr/hr</u>	(9) Shipment Description:  A. Work Package Number <u>2W-89-01060/W</u> B. Cask Seal Number <u>19</u> C. Sampler Number Used <u>11-29-89, 1650</u> D. Date and Time Sampler Unseated <u>10%</u> E. Expected Liquid Content <u>90%</u> F. Expected Solid Content <u>350 Mr/hr.</u> G. Dose Rate Through Drill String <u>79 "</u> H. Expected Sample Length
Over Top Dose Rate	Side Dose Rate	Bottom Dose Rate	Smearable Contamination	
<u>10Mr/hr</u>	<u>3.5 Mr/hr</u>	<u>1.0 Mr/hr</u>	<u>1.0 Mr/hr</u>	
<u>1.0 Mr/hr</u>	<u>1.0 Mr/hr</u>	<u>1.0 Mr/hr</u>	<u>1.0 Mr/hr</u>	
<u>1.0 Mr/hr</u>	<u>1.0 Mr/hr</u>	<u>1.0 Mr/hr</u>	<u>1.0 Mr/hr</u>	
RPT <u>B. J. H.</u> (Signature)	RPT <u>VDM</u> (Signature)			

(10) INFORMATION (Include statement of laboratory tests to be performed.\*)

*Core #12 WHC-EP-0210 Waste Characterization Plan for the Hanford Site Single Shell Tanks*

\*Reference laboratory work request, if available.

Comments:

(11) POINT OF ORIGIN <u>241-U</u> <u>110</u>	(12) SENDER NAME <u>DCHartley</u> SENDER SIGNATURE <u>DCHartley</u>	(13) DATE AND TIME RELEASED <u>11-29-89</u> <u>2152</u>	(14) DESTINATION <u>2225</u> <u>Worley</u>	(15) RECIPIENT NAME <u>John C. Abercrombie</u> RECIPIENT SIGNATURE <u>John C. Abercrombie</u>	(17) DATE AND TIME RECEIVED <u>11/29/89</u> <u>22:07</u>
(15) Seal Intact Upon Release? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(18) Seal Intact Upon Receipt? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(19) Seal Data Consistent with this Record? Shipment No. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			Sample No. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

# Single Shell Tank Waste Characterization Summary of Core Sample

TANK ID:	241-U-110
RISER ID:	R2
CORE ID:	#12

DATE SAMPLING INITIATED:	11-29-89
DATE SAMPLING COMPLETED:	11-29-89

SEGMENT	
1	Lab Serial No. F0393
	Customer ID No. 89-069
	Last Segment? NO
2	Lab Serial No. F0417
	Customer ID No. 89-070
	Last Segment? NO
3	Lab Serial No. F0441
	Customer ID No. 89-071
	Last Segment? NO
4	Lab Serial No. F0465
	Customer ID No. 89-072
	Last Segment? YES
5	Lab Serial No.
	Customer ID No.
	Last Segment?
6	Lab Serial No.
	Customer ID No.
	Last Segment?
7	Lab Serial No.
	Customer ID No.
	Last Segment?

SEGMENT	
8	Lab Serial No.
	Customer ID No.
	Last Segment?
9	Lab Serial No.
	Customer ID No.
	Last Segment?
10	Lab Serial No.
	Customer ID No.
	Last Segment?
11	Lab Serial No.
	Customer ID No.
	Last Segment?
12	Lab Serial No.
	Customer ID No.
	Last Segment?
13	Lab Serial No.
	Customer ID No.
	Last Segment?
14	Lab Serial No.
	Customer ID No.
	Last Segment?

## **SAMPLE DATA SUMMARY**

# SUMMARY DATA REPORT

Report results are sample wet weight.

## Single Shell Tank Project

Tank: 241-U-110

Core: 12

Segment: 3

Customer ID: 89-071

## Acid Digestion Results

Undigested Sample Results		ICP Results	
		Sample	Duplicate
		ug/g	ug/g
pH	12.49	13.09	Aluminum 41643 ug/g      49481 ug/g
Percent Water	39.06%	39.04%	Antimony LT      LT
			Arsenic LT      LT
			Barium LT      LT
			Beryllium LT      LT
			Bismuth 37353 ug/g      41129 ug/g
			Boron 802 ug/g      15 ug/g
Fusion Analysis Results			Cadmium LT      LT
			Calcium 483 ug/g      447 ug/g
Fusion Dissolution	2.82 g/L	2.52 g/L	Chromium 917 ug/g      924 ug/g
			Copper LT      LT
Total Alpha	4.29E-01 uci/g	4.44E-01 uci/g	Europium LT      LT
Total Beta	8.51E+02 uci/g	9.68E+02 uci/g	Iron 21823 ug/g      22935 ug/g
			Lanthanum LT      LT
GEA Cs-137	6.35E+01 uci/g	5.44E+01 uci/g	Lead 226 ug/g      403 ug/g
			Lithium LT      LT
Uranium	2.15E+03 ug/g	1.63E+03 ug/g	Magnesium 287 ug/g      570 ug/g
			Manganese 927 ug/g      973 ug/g
			Mercury 550 ug/g      936 ug/g
			Molybdenum LT      LT
Water Digestion Results			Nickel LT      LT
			Potassium LT      LT
Water Digestion	10.03 g/L	9.74 g/L	Samarium LT      LT
			Selenium LT      284 ug/g
			Silver LT      LT
Ion Chromatograph			Sodium 119306 ug/g      106345 ug/g
Fluoride	1.58E+04 ug/g	1.54E+04 ug/g	Strontium 234 ug/g      232 ug/g
Chloride	2.00E+03 ug/g	1.94E+03 ug/g	Sulfur 644 ug/g      723 ug/g
Nitrate	6.31E+04 ug/g	7.66E+04 ug/g	Tantalum LT      LT
Phosphate	5.43E+04 ug/g	4.67E+04 ug/g	Thallium LT      LT
Sulfate	5.21E+03 ug/g	4.65E+03 ug/g	Thorium LT      LT
			Tin LT      LT
Total Organic Carbon	7.13E+02 ug/g	7.34E+02 ug/g	Titanium LT      LT
			Uranium LT      LT
			Vanadium LT      LT
			Zinc 262 ug/g      154 ug/g
			Zirconium LT      LT

LT: Less Than

NC: Not Calibrated

NOT CALC: Not Calculated

# Instrument Standards Outside Control Limits

## **PHYSICAL TEST RESULTS**

# Single Shell Tank

## Extrusion of Segment -- Physical Tests

LAB SEGMENT SERIAL #:	F0465	CUSTOMER ID:	89-072
ANALYST:	Richard L. Weiss	DATE EXTRUDED:	January 29, 1990
DRAINABLE LIQUID	Liquid Submitted for Segment Analysis? -- NO		
GROSS	<10ml	TARE	NET
SERIAL		DATE/TIME	ESTIMATED
SPECIFIC		CALCULATED	

APPEARANCE OF LIQUID: No liquid was collected

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### DIMENSIONS OF SEGMENT

Completed Segment Obtained?	No	LENGTH:	10 in.	CALCULATED VOLUME:	7.9 in <sup>3</sup>
REMARKS	None				

APPEARANCE OF SOLIDS: Light brown solids. Upper 1.5 in. medium brown, and very smooth in appearance.

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PENETROMETER	11.3	lbs/sq in	REMARKS:	None
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### HOMOGENIZATION

PROCEDURE:	T038A-00712	REVISION:	F	QUANTITY OF MATERIAL:	192.11	GRAMS
DATE HOMOGENIZED:	02-14-90	TIME HOMOGENIZED:		5.0	MINUTES	
OPERATOR:	K. J. Patterson					

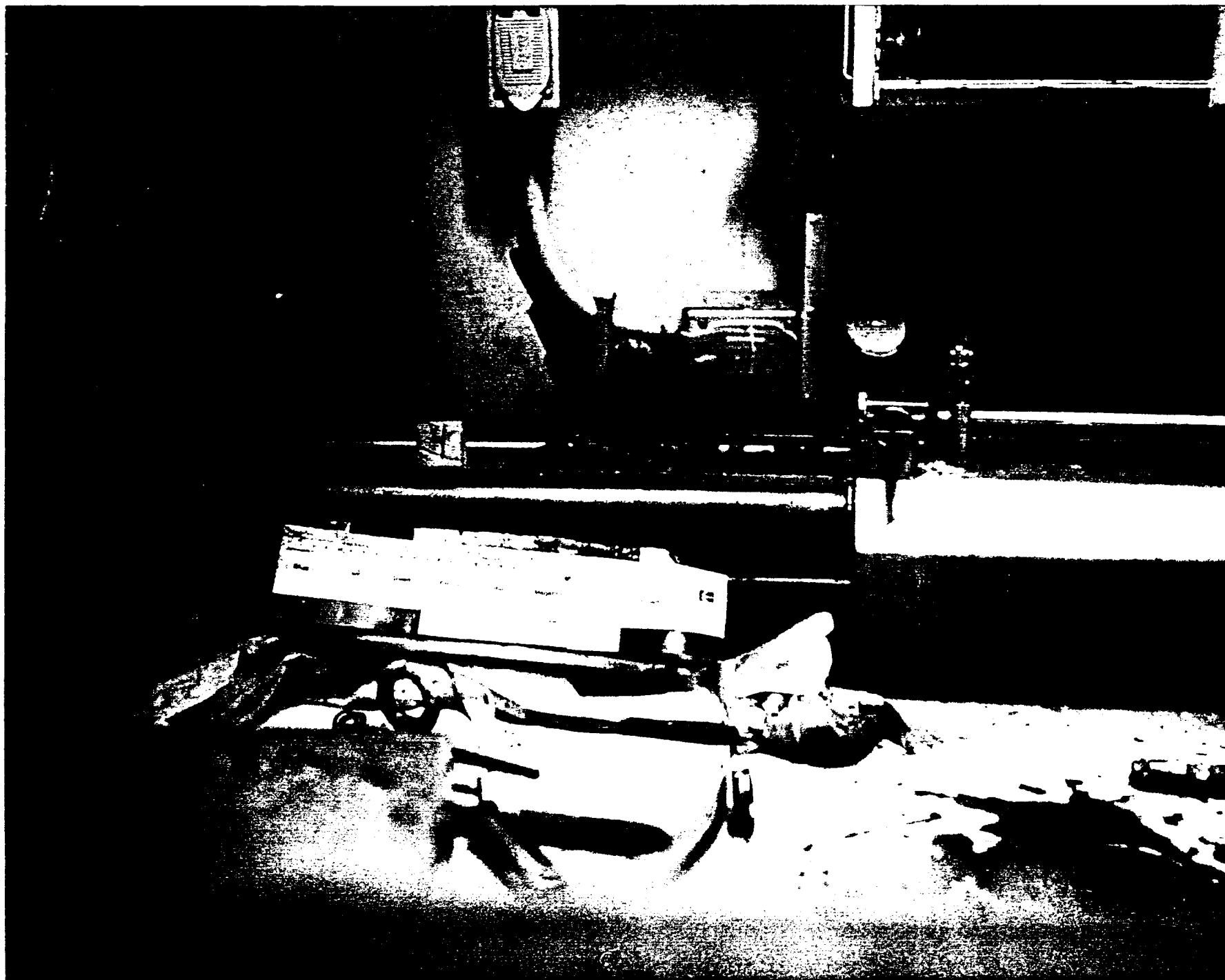
LABORATORY NOTEBOOK REFERENCE	WHC-N-313-4	26
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Notebook No.

Page No.

# Single Shell Tank Segment -- Subsamples

<b>LAB SEGMENT SERIAL #:</b> F0465 <b>CUSTOMER ID:</b> 89-072		
<b>VOLATILE ORGANIC ANALYSIS</b>		
VOA SAMPLE	LAB SERIAL #: 89-072-278	DATE SAMPLED: 01-29-90
Sample shipped to PNL		
<b>PARTICLE SIZE DISTRIBUTION ANALYSIS</b>		
PARTICLE SIZE SAMPLE	LAB SERIAL #: F0465	DATE SAMPLED: 01-29-90
<b>Homogenized Solids</b>		
<b>UNDIGESTED SOLIDS ANALYSIS</b>		
LABORATORY SERIAL NUMBER FOR SAMPLE:	F0465	DATE SAMPLED: 02-14-90
LABORATORY SERIAL NUMBER OF DUPLICATE SAMPLE: F0466		
<b>FUSION ANALYSIS OF SOLIDS</b>		
LABORATORY SERIAL NUMBER OF SAMPLE:	F0470	DATE SAMPLED: 02-14-90
LABORATORY SERIAL NUMBER OF DUPLICATE SAMPLE: F0471		
LABORATORY SERIAL NUMBER OF SPIKED SAMPLE: F0472		
<b>ACID DIGESTION ANALYSIS OF SOLIDS</b>		
LABORATORY SERIAL NUMBER OF SAMPLE:	F0480	DATE SAMPLED: 02-14-90
LABORATORY SERIAL NUMBER OF DUPLICATE SAMPLE: F0481		
LABORATORY SERIAL NUMBER OF SPIKED SAMPLE: F0482		
<b>WATER DIGESTION ANALYSIS OF SOLIDS</b>		
LABORATORY SERIAL NUMBER OF SAMPLE:	F0475	DATE SAMPLED: 02-14-90
LABORATORY SERIAL NUMBER OF DUPLICATE SAMPLE: F0476		
LABORATORY SERIAL NUMBER OF SPIKED SAMPLE: F0477		
<b>Laboratory Notebook Reference</b>		
WHC-N-313-4		32
Notebook No. _____		
Page No. _____		



TANK 241-U-110, CORE 12, SEGMENT 4

## B r i n k m a n

## Particle Size Analyzer

PROCESS CHEMISTRY LABS PARTICLE ANALYSIS  
VIA BRINKMANN 2010  
STATISTICS

SAMPLE NAME : SST,8000279,F0465,GLY-ETOH,SBK

FILE NAME : F0465.001

DATE	:	22/02/1990	ACO. RANGE	:	0.5-150	COUNTS	:	53365
TIME	:	10:37	ACO. MODE	:	SAMPLE	S.N.F.	:	0.91
CONFIG.	:	1 (0.7 S1)	ACO. TIME	:	317 SEC	S.D.U.	:	2066
CELL TYPE	:	MAGNETIC (3)	SAMPLE SIZE	:	4	CONCENTR.	:	6.6E+06 #/ml
SAMPLE TYPE	:	REGULAR	RED. CONF.	:	95.00%(V)	SOLIDS	:	6.3E-03 %

## MEAN Diameter                                    S.D.

Number, Length	:	0.99 $\mu$ m	0.94 $\mu$ m
Number, Area	:	1.37 $\mu$ m	1.02 $\mu$ m
Number, Volume	:	2.63 $\mu$ m	1.69 $\mu$ m
Length, Area	:	1.89 $\mu$ m	3.85 $\mu$ m
Length, Volume	:	4.29 $\mu$ m	4.53 $\mu$ m
Area, Volume	:	9.71 $\mu$ m	15.01 $\mu$ m
Volume, Moment	:	32.90 $\mu$ m	24.23 $\mu$ m

## MEDIAN Diameter                                    MODE                                    CONFIDENCE

Number	:	0.81 $\mu$ m	0.75 $\mu$ m	100.00%
Area	:	3.58 $\mu$ m	50.33 $\mu$ m	85.09%
Volume	:	32.99 $\mu$ m	50.33 $\mu$ m	99.67%

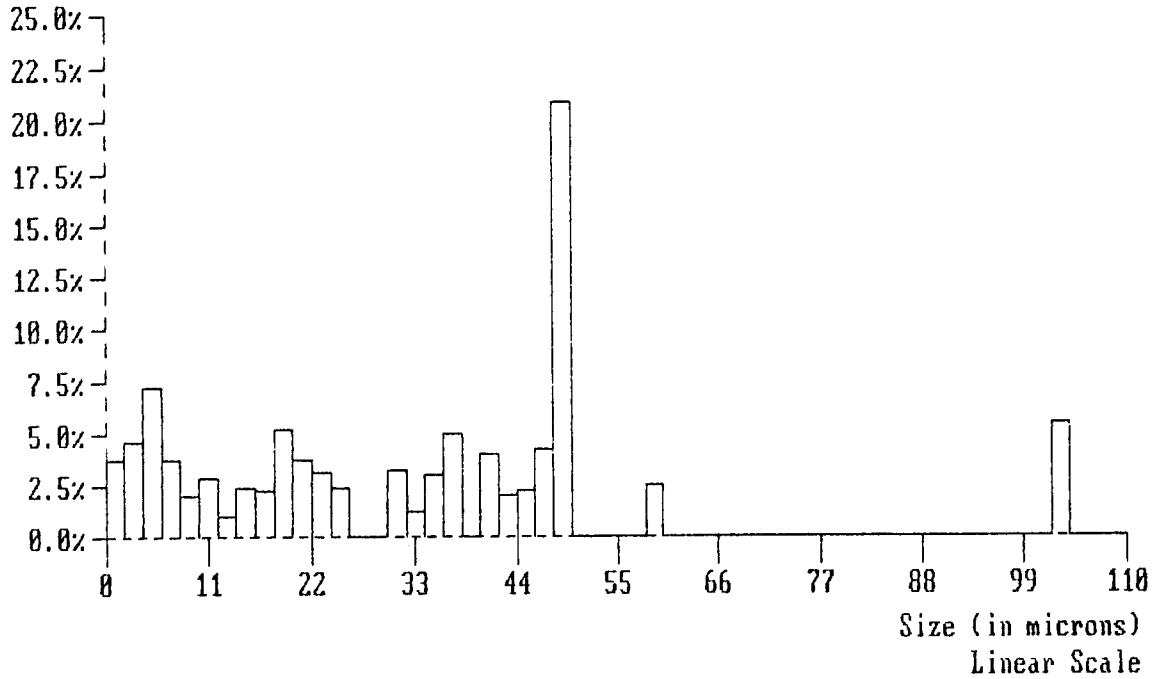
Organics present in sample; dispersed in etOH-glycerine

SAMPLE NAME : SST,B000279,F0465,GLY-ETOH,SBK  
FILE NAME : F0465.001

DATE	: 22/02/1990	ACQ. RANGE	: 0.5-150	COUNTS	: 59965
TIME	: 10:37	ACQ. MODE	: SAMPLE	S.N.F.	: 0.91
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 317 SEC	S.D.U.	: 2868
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 6.6E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 6.3E-03 %

PROBABILITY VOLUME DENSITY GRAPH

Name: SST,B000279,F0465,GLY-ETOH,SBK  
6.3E-05 cc/ml(100.0%)  
Mode at 49.00  $\mu\text{m}$   
<< SCALE RANGE ( $\mu\text{m}$ ): ADJUSTED >>  
Median : 32.99  $\mu\text{m}$   
Mean( $\text{nv}$ ): 2.63  $\mu\text{m}$   
S.D.( $\text{nv}$ ): 1.89  $\mu\text{m}$   
S.D.( $\text{vm}$ ): 24.28  $\mu\text{m}$   
Conf( $\text{vm}$ ): 99.67 %



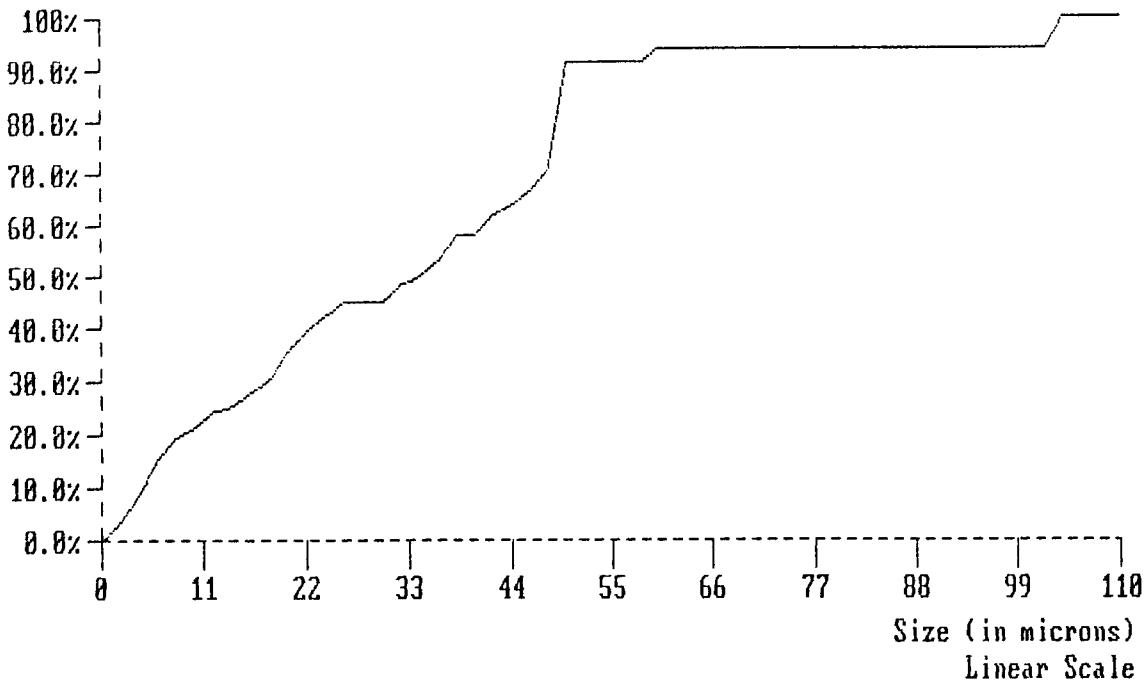
SAMPLE NAME : SST,B000279,F0465,GLY-ETOH,SBK  
FILE NAME : F0465.001

DATE	:	22/02/1990		ACQ. RANGE	:	0.5-150		COUNTS	:	53365
TIME	:	10:37		ACQ. MODE	:	SAMPLE		S.N.F.	:	0.91
CONFIG.	:	1 (0.7 S1)		ACQ. TIME	:	317 SEC		S.D.U.	:	2868
CELL TYPE	:	MAGNETIC (3)		SAMPLE SIZE	:	4		CONCENTR.	:	6.6E+06 #/ml
SAMPLE TYPE	:	REGULAR		REQ. CONF.	:	95.00%(V)		SOLIDS	:	6.3E-03 %

### PROBABILITY VOLUME DISTRIBUTION GRAPH

Name: SST,B000279,F0465,GLY-ETOH,SBK  
6.3E-05 cc/ml(100.0%)      Median : 32.99 $\mu$ m  
Mean(nv): 2.63 $\mu$ m      Mean(vm): 32.90 $\mu$ m  
S.D.(nv): 1.89 $\mu$ m      S.D.(vm): 24.28 $\mu$ m  
Conf(vm): 99.67 %

<< SCALE RANGE ( $\mu$ m): ADJUSTED >>



# בְּרִיאָהַתְּנוּ אֶת־עַמְּךָ יִשְׂרָאֵל

### Particle Size Analyzer

PROCESS CHEMISTRY LABS PARTICLE ANALYSIS  
VIA BRINEMANN 2010  
STATISTICS

SAMPLE NAME : SST, B000279, F00465, GLY-ETOH, SBK  
FILE NAME : F0465.002

DATE : 22/02/1990 | ACO. RANGE : 0.5-60 | COUNTS : 16957  
 TIME : 10:51 | ACO. MODE : SAMPLE | S.N.F. : 0.91  
 CONFIG. : 1 (0.7 S1) | ACO. TIME : 95 SEC | S.D.U. : 9342  
 CELL TYPE : MAGNETIC (3) | SAMPLE SIZE : 3 | CONCENTR. : 7.2E+06 #/ml  
 SAMPLE TYPE : REGULAR | REQ. CONF. : 95.00% (V) | SOLIDS : 9.1E-03 %

MEAN Diameter S.D.

Number, Length	2	0.89 $\mu\text{m}$	0.98 $\mu\text{m}$
Number, Area	2	1.33 $\mu\text{m}$	1.08 $\mu\text{m}$
Number, Volume	2	2.89 $\mu\text{m}$	2.23 $\mu\text{m}$
Length, Area	2	1.98 $\mu\text{m}$	4.82 $\mu\text{m}$
Length, Volume	2	5.21 $\mu\text{m}$	5.81 $\mu\text{m}$
Area, Volume	2	13.74 $\mu\text{m}$	19.06 $\mu\text{m}$
Volume, Moment	2	40.19 $\mu\text{m}$	18.78 $\mu\text{m}$

Number	2	0.71 $\mu\text{m}$	0.55 $\mu\text{m}$	100.00%
Area	2	4.24 $\mu\text{m}^2$	53.27 $\mu\text{m}^2$	60.72%
Volume	2	51.26 $\mu\text{m}^3$	53.27 $\mu\text{m}^3$	98.88%

SAMPLE NAME : SST,B000279,F00465,GLY-ETOH,SBK  
FILE NAME : F0465.002

DATE	:	22/02/1990		ACQ. RANGE	:	0.5-60		COUNTS	:	16957
TIME	:	10:51		ACQ. MODE	:	SAMPLE		S.N.F.	:	0.91
CONFIG.	:	1 (0.7 S1)		ACQ. TIME	:	95 SEC		S.D.U.	:	3342
CELL TYPE	:	MAGNETIC (3)		SAMPLE SIZE	:	3		CONCENTR.	:	7.2E+06 #/ml
SAMPLE TYPE	:	REGULAR		REQ. CONF.	:	95.00%(V)		SOLIDS	:	9.1E-03 %

### PROBABILITY NUMBER DENSITY GRAPH

Name: SST,B000279,F00465,GLY-ETOH,SBK

7.2E+06 #/ml( 99.9%)

Mode at 0.70  $\mu\text{m}$

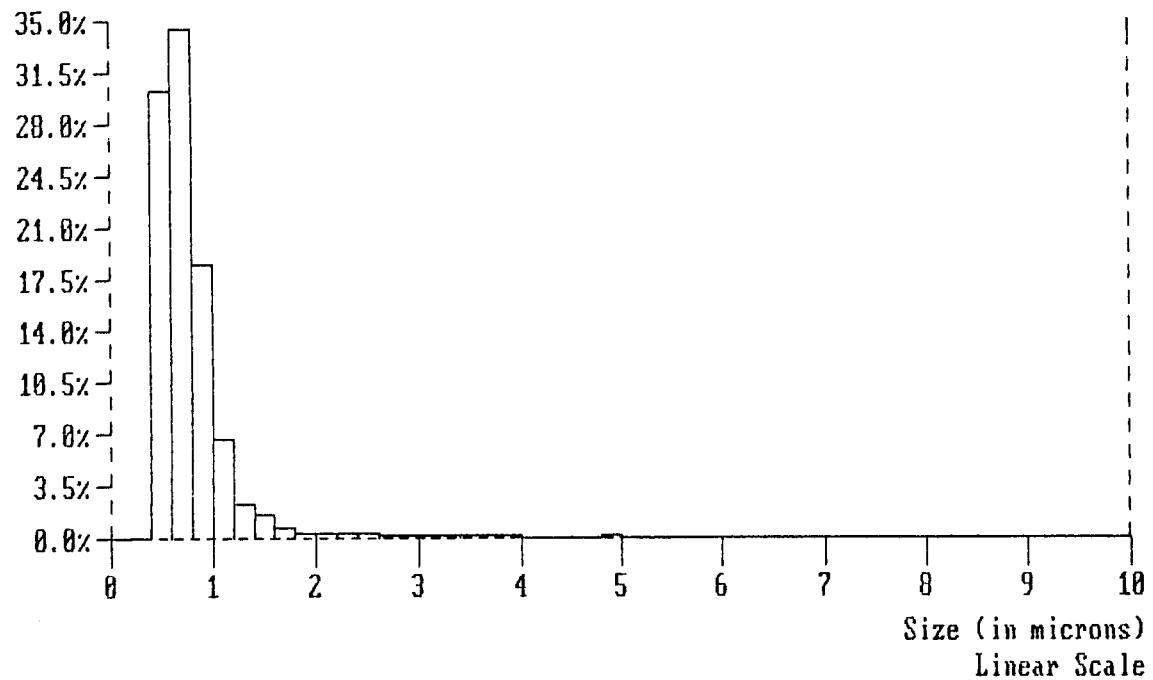
<< SCALE RANGE ( $\mu\text{m}$ ): 0 - 10 >>

Local Median : 0.71 $\mu\text{m}$

Local Mean(nl): 0.87 $\mu\text{m}$

Local S.D.(nl): 0.68 $\mu\text{m}$

Local Conf(nl): 100.00 %



SAMPLE NAME : SST,B000279,F00465,GLY-ETOH,SBK  
FILE NAME : F0465.002

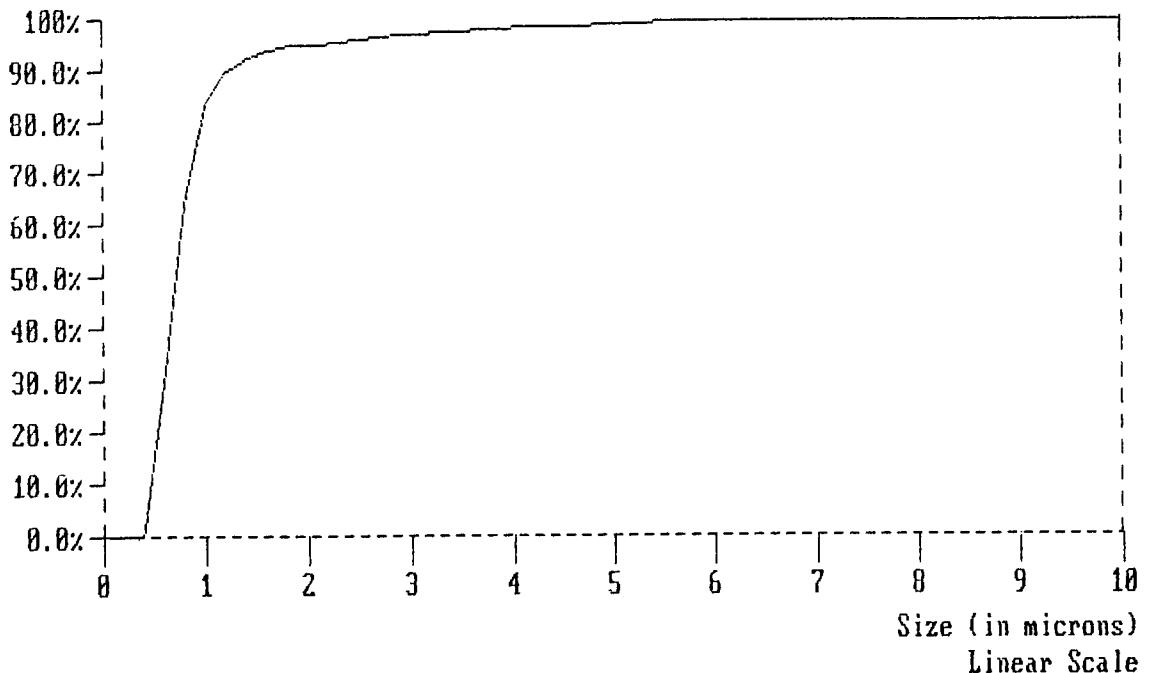
DATE	:	22/02/1990		ACQ. RANGE	:	0.5-60		COUNTS	:	16957
TIME	:	10:51		ACQ. MODE	:	SAMPLE		S.N.F.	:	0.91
CONFIG.	:	1 (0.7 S1)		ACQ. TIME	:	95 SEC		S.D.U.	:	3342
CELL TYPE	:	MAGNETIC (3)		SAMPLE SIZE	:	3		CONCENTR.	:	7.2E+06 #/ml
SAMPLE TYPE	:	REGULAR		REQ. CONF.	:	95.00%(V)		SOLIDS	:	9.1E-03 %

### PROBABILITY NUMBER DISTRIBUTION GRAPH

Name: SST,B000279,F00465,GLY-ETOH,SBK  
7.2E+06 #/ml( 99.9%)

Local Median : 0.71 $\mu$ m  
Local Mean(nl): 0.87 $\mu$ m  
Local S.D.(nl): 0.68 $\mu$ m  
Local Conf(nl): 100.00 %

<< SCALE RANGE ( $\mu$ m): 0 - 10 >>



## **UNDIGESTED SAMPLE ANALYSIS**

**Single Shell Tank Project****Untreated Sample Results**

Tank: 241-U-110  
Core: 12  
Segment: 4  
Customer ID: 89-072

	Check Standard	Blank	Sample	Sample Duplicate	Check Standard
Laboratory ID:	F0464	F0485	F0465	F0466	F0468
pH	100.80%	9.72	12.53	12.53 -	100.90%
Laboratory ID:	F0416	F0437	F0465	F0466	F0564
%Water	98.30%	6.2mg	44.10%	44.36%	96.95%

# Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	N/A
PROCEDURE/REV	LA-212-103/A-1
TECHNOLOGIST	Mary Franz
DATE	March 06, 1990
TEMPERATURE	21.9 C
STARTING TIME	1000
ENDING TIME	1530
CHEMIST	R. E. Brandt

pH analysis of the solid sample

	DESCRIPTION	LAB ID
1	Initial LMCS Check Std.	F0464
2	Reagent Blank	F0485
3	Sample 89-072	F0465
4	Duplicate Sample 89-072	F0466
5	Final LMCS Check Std.	F0468
6		
7		
8		
9		
10		
11		

	DESCRIPTION	LAB ID
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY Book # & ALIQUOT VOL.	SECOND Book # & ALIQUOT VOL.	THIRD Bk# & ALQ.T.VOL.	FINAL VOL. OF STD.
LMCS Check Standard	72C11-B/1.0 mL			1.0 mL

# Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	N/A
PROCEDURE/Rev	LA-564-101/D-1
TECHNOLOGIST	R. D. Hale
DATE	March 02, 1990
TEMPERATURE	120 C
STARTING TIME	1400 03-01-90
ENDING TIME	1430 03-02-90
CHEMIST	R. E. Brandt

% Water in Sample 89-072

	DESCRIPTION	LAB ID
1	Initial LMCS Check Std.	F0416
2	Reagent Blank	F0437
3	Sample 89-070	F0417
4	Duplicate Sample 89-070	F0418
5	Sample 89-071	F0441
6	Duplicate Sample 89-071	F0442
7	Sample 89-072	F0465
8	Duplicate Sample 89-072	F0466
9	Sample 89-073	F0489
10	Duplicate Sample 89-073	F0490
11	Sample 89-074	F0513

	DESCRIPTION	LAB ID
12	Duplicate Sample 89-074	F0514
13	Sample 89-075	F0537
14	Duplicate Sample 89-075	F0538
15	Sample 89-076	F0561
16	Duplicate Sample 89-076	F0562
17	Final LMCS Check Std	F0564
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY Book # & ALIQUOT VOL.	SECOND Book # & ALIQUOT VOL.	THIRD Bk# & ALot.VOL.	FINAL VOL. OF STD.
LMCS Check Standard	11C11AH/1.0 mL			1.0 mL

## **KOH FUSION ANALYSIS**

## Single Shell Tank Project

## Fusion Analysis

Units for Samples Are Wet Weight

## Results Of Sample Solids

Tank: 241-U-110  
 Core: 12  
 Segment: 4  
 Customer ID: 89-072

		Check Standard	Blank	Sample		Sample Duplicate	Spike of Sample	Check Standard
Laboratory ID:		N/A	F0436	F0470		F0471	N/A	N/A
Fusion Digestion		N/A	N/A	2.88	g/L	3.52	g/L	N/A
Laboratory ID:	F0469	F0484	F0470		F0471	F0472	F0473	
Total Alpha	97.20%	<7.65E-05 uci/L	5.97E-01 uci/g	<5.00E-01 uci/g		103.30%	95.40%	
Total Beta	100.90%	4.40E-04 uci/L	2.05E+03 uci/g	1.98E+03 uci/g		112.10%	99.50%	
Laboratory ID:	F0421	F0436	F0470		F0471	F0568	F0569	
GEA Cs-137	98.30%	<4.81E-04 uci/L	2.36E-01 uci/g	2.24E+01 uci/g		93.50%	97.30%	
Laboratory ID:	F0469	F0484	F0470		F0471	F0472	F0473	
Uranium	83.70%	<7.40E-05 g/L	7.33E+03 ug/g	6.62E+03 ug/g		123.20%	85.00%	

## Single Shell Tank Project

**FUSION ANALYSIS**  
**Results On Laboratory Solutions**

Tank: 241-U-110  
 Core: 12  
 Segment: 4  
 Customer ID: 89-072

	Check Standard N/A	Blank F0436	Sample F0470	Sample Duplicate F0471	Spike of Sample N/A	Check Standard N/A
Laboratory ID: Fusion Digestion	N/A	Complete	2.88 g/L	3.52 g/L	N/A	N/A
Laboratory ID:	F0469	F0484	F0470	F0471	F0472	F0473
Total Alpha	97.20%	<7.63E-05 uci/L	1.72 uci/L	<1.76 uci/L	103.30%	95.40%
Total Beta	100.90%	4.40E-04 uci/L	5.91E+03 uci/L	6.96E+03 uci/L	112.10%	99.50%
Laboratory ID: GEA Cs-137	F0421 98.30%	F0436 <4.81E-04 uci/L	F0470 6.79E+01 uci/L	F0471 7.87E+01 uci/L	F0568 93.50%	F0569 97.30%
Laboratory ID: Uranium	F0469 83.70%	F0484 <7.40E-05 g/L	F0470 2.11E-02 g/L	F0471 2.33E-02 g/L	F0472 123.20%	F0473 85.00%

# Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	N/A
PROCEDURE/REV	LA-549-141/A-1
TECHNOLOGIST	R. D. Hale
DATE	March 10, 1990
TEMPERATURE	450 C
STARTING TIME	0800
ENDING TIME	1200
CHEMIST	S. A. Catlow

Fusion Dissolution

	DESCRIPTION	LAB ID
1	Reagent Blank	F0436
2	Sample 89-070	F0422
3	Duplicate Sample 89-070	F0423
4	Sample 89-071	F0446
5	Duplicate Sample 89-071	F0447
6	Sample 89-072	F0470
7	Duplicate Sample 89-072	F0471
8	Sample 89-075	F0442
9	Duplicate Sample 89-075	F0443
10	Sample 89-076	F0566
11	Duplicate Sample 89-076	F0567

	DESCRIPTION	LAB ID
12	Sample 89-077	F1095
13	Duplicate Sample 89-077	F1096
14	Sample 89-078	F1119
15	Duplicate Sample 89-078	F1120
16	Sample 89-079	F1143
17	Duplicate Sample 89-079	F1144
18	Sample 89-080	F1167
19	Duplicate Sample 89-080	F1168
20		
21		
22		

STANDARD TYPE	PRIMARY Book # & ALIQUOT VOL.	SECOND Book # & ALIQUOT VOL.	THIRD Bk# & ALot.VOL.	FINAL VOL. OF STD.
N/A				

# Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	WA57277
PROCEDURE/REV	LA-508-101/C-2
TECHNOLOGIST	Mary Franz
DATE	March 10, 1990
TEMPERATURE	N/A
STARTING TIME	0830
ENDING TIME	1030
CHEMIST	S. A. Catlow

Total Beta & Total Alpha  
Analysis of the Fusion  
Dissolution.  
Detector #15

	DESCRIPTION	LAB ID
1	Initial LMCS Check Std.	F0469
2	Reagent Blank	F0484
3	Sample 89-072	F0470
4	Duplicate Sample 89-072	F0471
5	Spike of Sample 89-072	F0472
6	Final LMCS Check Std.	F0473
7		
8		
9		
10		
11		

	DESCRIPTION	LAB ID
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY Book # & ALIQUOT VOL.	SECOND Book # & ALIQUOT VOL.	THIRD Bk# & ALot.VOL.	FINAL VOL. OF STD.
LMCS Check Standard	132B44/10 mL			N/A
Spike	132B44/10 mL	F0470/1.0 uL		N/A

# Single Shell Tank Calibration Record

ANALYTE: Am<sup>241</sup>

PROCEDURE: LQ-508-002

REVISION: A-0

INSTRUMENT: Detector #15

PROPERTY NUMBER: WA57276

TECHNOLOGIST: R.A. Jones

PAYROLL NUMBER: 65801

DATE: March 3, 1990

CALIBRATION STANDARD ID: 36B40A8; 36B40B7; 36B40C7; 36B40A3; 36B40B3; 36B40C3;  
36B40A6; 36B40B6; 36B40C5

ANALYTE CONCENTRATION: N/A

TYPE OF CALIBRATION: Efficiency

SST-103 Rev. (Draft) 9/15/90 Short Interim

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

DETECTOR No.DET 15

TIME ZERO DATE (HD): 15897

RADIOMUCLIDE: Am-241

DATE COUNTED (HD): 16595

HALF LIFE: 154497

COUNT TIME: 5

CPM BKG: 0.5

CALIBRATED BY: RA JONES

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A8	1	03/03/90	0056	92907	92752	92932	93124
36B40B7	1	03/03/90	0109	164871	165823	165202	164885
36B40C7	1	03/03/90	0123	238572	238414	237538	237678
36B40A3	2	03/03/90	0136	73407	73242	73418	73818
36B40B3	2	03/03/90	0148	133719	133357	132740	133381
36B40C3	2	03/03/90	0202	187650	188370	188565	189527
36B40A6	5	03/03/90	0214	65974	63160	64479	65939
36B40B6	5	03/03/90	0227	137241	133185	127193	132343
36B40C5	5	03/03/90	0240	182035	182021	175939	183009
STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY	
36B40A8	1"	60570	18585	1.00	18644	0.3078	
36B40B7	1"	109900	33039	1.00	33142	0.3016	
36B40C7	1"	159700	47610	1.00	47759	0.2991	
AVERAGE, 1" =		0.3028 +/- 095%	0.0088	2.92 %		ON	09/09/90
STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY	
36B40A3	2"	61800	14694	1.00	14740	0.2385	
36B40B3	2"	110700	26659	1.00	26743	0.2416	
36B40C3	2"	161400	37705	1.00	37823	0.2343	
AVERAGE, 2" =		0.2381 +/- 095%	0.0071	2.99 %		ON	09/09/90
STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY	
36B40A6	5"	59470	12977	1.00	13018	0.2189	
36B40B6	5"	109800	26498	1.00	26581	0.2421	
36B40C5	5"	160100	36150	1.00	36263	0.2265	
AVERAGE, 5" =		0.2292 +/- 095%	0.0232	10.11 %		ON	09/09/90
NEW EFFS FOR DET 15 Am-241		1" =	0.3028	2" =	0.2381		
		5" =	0.2292				

# Single Shell Tank Calibration Record

ANALYTE: Co <sup>60</sup>	
PROCEDURE: LQ-508-002	REVISION: A-0
INSTRUMENT: Detector #15	PROPERTY NUMBER: WA57277
TECHNOLOGIST: R.A. Jones	PAYROLL NUMBER: 65801
DATE: May 3, 1990	
CALIBRATION STANDARD ID: 100B40A2; 100B40B1; 100B40C1; 32B40A4; 32B40B3; 32B40C4; 32B40A5; 32B40B6; 32B40C5	
ANALYTE CONCENTRATION: N/A	
TYPE OF CALIBRATION: Efficiency	

SST-103 Rev. (Draft) 9/15/90 Short Interim

## CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

DETECTOR No.	15	2", 5" STD	TIME ZERO DATE (HD):	15883
RADIOMUCLIDE:	Co-60	1" STD	TIME ZERO DATE (HD):	16573
HALF LIFE:	1925		DATE COUNTED (HD):	16595
COUNT TIME:	5		DATE COUNTED 1" (HD)	16595
CPM BKG:	8			
CPM 1" BKG:	8			

CALIBRATED BY: RA JONES

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
100B40A2	1	03/03/90	0253	111380	110747	111696	111703
100B40B1	1	03/03/90	0305	227251	227654	226737	227044
100B40C1	1	03/03/90	00318	328474	327446	327088	326036
32B40A4	2	03/03/90	0330	86815	86915	86832	86082
32B40B3	2	03/03/90	0342	169113	168274	168996	167860
32B40C4	2	03/03/90	0354	243994	243963	244914	244649
32B40A5	5	03/03/90	0406	73505	72852	75820	75343
32B40B6	5	03/03/90	0417	148130	155479	156650	154379
32B40C5	5	03/03/90	0430	222669	220281	220095	224735
STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY	
100B40A2	1"	67290	22268	1.01	22445		0.3336
100B40B1	1"	137800	45426	1.01	45788		0.3323
100B40C1	1"	199700	65444	1.01	65965		0.3303
AVERAGE, 1" =		0.3321 +/- 095%	0.0032	0.96 %	ON	09/09/90	
STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY	
32B40A4	2"	70480	17324	1.29	22387		0.3176
32B40B3	2"	135100	33704	1.29	43554		0.3224
32B40C4	2"	202400	48868	1.29	63149		0.3120
AVERAGE, 2" =		0.3173 +/- 095%	0.0102	3.21 %	ON	09/09/90	
STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY	
32B40A5	5"	70160	14868	1.29	19213		0.2738
32B40B6	5"	135700	30724	1.29	39703		0.2926
32B40C5	5"	201900	44381	1.29	57351		0.2841
AVERAGE, 5" =		0.2835 +/- 095%	0.0184	6.48 %	ON	09/09/90	
NEW EFFS FOR DET		15 Co-60	1" =	0.3321	2" =	0.3173	
			5" =	0.2835			

# Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	N/A
PROCEDURE/REV	LA-548-121/C-2
TECHNOLOGIST	R. D. Hale
DATE	March 14, 1990
TEMPERATURE	23 C
STARTING TIME	0900
ENDING TIME	1000
CHEMIST	S. A. Catlow

GEA Analysis  
Fusion Dissolution  
Samples are prepared in batch,  
but counted randomly.

	DESCRIPTION	LAB ID
1	Initial LMCS Check Std.	F0421
2	Reagent Blank	F0436
3	Sample 89-070	F0422
4	Duplicate Sample 89-070	F0423
5	Sample 89-071	F0446
6	Duplicate Sample 89-071	F0447
7	Sample 89-072	F0470
8	Duplicate Sample 89-072	F0471
9	Sample 89-071	F0442
10	Duplicate Sample 89-071	F0443
11	Sample 89-076	F0566

	DESCRIPTION	LAB ID
12	Duplicate Sample 89-076	F0567
13	Spike 89-076	F0568
14	Final LMCS Check Std.	F0569
15		
16		
17		
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY Book # & ALIQUOT VOL.	SECOND Book # & ALIQUOT VOL.	THIRD Bk# & ALQT.VOL.	FINAL VOL. OF STD.
LMCS Check Standard	122B44/500 uL			22 mL
Spike	122B44/500 uL	F0447/50 uL		22 mL

# Single Shell Tank Calibration Record

ANALYTE: Isotope, Mixed Gamma

PROCEDURE: LQ-508-003

REVISION: A-0

INSTRUMENT: GEA Detector #1

PROPERTY NUMBER: 401934

TECHNOLOGIST: J. L. Anderson

PAYROLL NUMBER: 61413

DATE: February 14, 1990

CALIBRATION STANDARD ID: 56B40 D1

ANALYTE CONCENTRATION: N/A

TYPE OF CALIBRATION: Gamma Energy Analysis (Efficiency)

COMMENTS:

DETECTOR: 1  
 GEOMETRY CODE: 42  
 GEOMETRY DESCRIPTION: 22 ML LIQUID, POS 2  
 CALIBRATION DATE: 14-Feb-89  
 ANALYST(S): J. L. ANDERSON/M. R. DOWELL  
 STANDARD ID: 56B40 D1

ENERGY (KEV)	EFFICIENCY (COUNTS/GAMMA)
59.536	5.721347E-03
88.032	1.512568E-02
122.0614	2.041950E-02
165.853	1.856472E-02
279.1967	
391.668	1.042777E-02
513.99	7.856059E-03
661.65	6.838966E-03
898.021	5.300244E-03
1173.237	4.218416E-03
1332.501	3.785537E-03
1836.129	2.931033E-03

EQUATION 0-165 KEV

$$\begin{aligned} \text{LOG(EFF)} = & -5.343694\text{E+01} \\ & + 2.034704\text{E+01} * \text{LOG(ENERGY)} \\ & + -2.088264\text{E+00} * \text{LOG(ENERGY)}^2 \end{aligned}$$

EQUATION 165-1836 KEV

$$\begin{aligned} \text{LOG(EFF)} = & 8.372735\text{E+00} \\ & + -7.762489\text{E+00} * \text{LOG(ENERGY)} \\ & + 2.017698\text{E+00} * \text{LOG(ENERGY)}^2 \\ & + -2.447560\text{E-01} * \text{LOG(ENERGY)}^3 \\ & + 1.067720\text{E-02} * \text{LOG(ENERGY)}^4 \end{aligned}$$

GEA CALIBRATION RECORD

PROCEDURE LQ-508-003

DETECTOR: 1  
 GEOMETRY CODE: 43  
 GEOMETRY DESCRIPTION: 22 ML LIQUID, POS 3  
 CALIBRATION DATE: 16-Feb-89  
 ANALYST(S): J. L. ANDERSON/M. R. DOWELL  
 STANDARD ID: 56B40 D1

ENERGY (KEV)	EFFICIENCY (COUNTS/GAMMA)
59.536	1.397695E-03
88.032	3.641448E-03
122.0614	5.035820E-03
165.853	4.620516E-03
279.1967	
391.668	2.619018E-03
513.99	1.890740E-03
661.65	1.782478E-02
898.021	1.392563E-03
1173.237	1.117189E-03
1332.501	1.007670E-03
1836.129	7.782502E-04

EQUATION 0-165 KEV

$$\text{LOG(EFF)} = -5.354869\text{E+01}$$

+ 1.975356E+01 \*LOG(ENERGY)  
+ -2.020858E+00 \*LOG(ENERGY)^2

EQUATION 165-1836 KEV

LOG(EFF) = 4.001880E+01  
+ -2.857555E+01 \*LOG(ENERGY)  
+ 6.748440E+00 \*LOG(ENERGY)^2  
+ 7.173093E-01 \*LOG(ENERGY)^3  
+ 2.821780E-02 \*LOG(ENERGY)^4

GEA CALIBRATION RECORD

PROCEDURE LQ-508-003

# CANBERRA SPECTRAN-F V2.06 SOFTWARE

**222-S COUNTING ROOM**

27-AUG-90 13:08:43

## ANALYSIS PARAMETERS

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 1.0  
DETECTOR NUMBER: 1 / GEOMETRY NUMBER: 42  
SPECTRUM SIZE: 4096 CHANNELS  
ORDER OF SMOOTHING FUNCTION: 5  
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK  
PEAK CONFIDENCE FACTOR: 85.0%  
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV  
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

## ENVIRONMENTAL BACKGROUND SUBTRACTED

#### ENVIRONMENTAL ENGINEERING LLD CALCULATION PERFORMED

#### MEASURED ENERGY DIFFERENCES LISTED

#### MULTIPLET ANALYSIS PERFORMED

## ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD1070

ANALYZED BY: VR

SAMPLE DESCRIPTION: F421 SEG F

## **GEOMETRY DESCRIPTION:**

SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 5.0000E-01

STANDARD SIZE: 1.0000E+00 EA

## **ANALYSIS LIBRARY FILE: ANL000**

COLLECT STARTED ON 14-MAR-90 AT 11:00:58

COLLECT LIVE TIME: 3000. SECONDS

REAL TIME: 3005. SECONDS

DEAD TIME: 0.17 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 23-NOV-89

EFFICIENCY CALIBRATION PERFORMED 2-MAR-89

222-S COUNTING ROOM

27-AUG-90 13:08:43

## P E A K   A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	1127.46	563.20	1.34	417.	456.	13.9	CS-134, EU-152
2C	1139.52	569.23	1.34	456.	822.	12.2	CS-134, BI-207
3C	1210.35	604.63	1.41	394.	5339.	3.3	CS-134
4C	1219.45	609.18	1.41	323.	79.	30.4	BI-214, RU-103
5	1324.22	661.55	1.47	366.	9209.	2.1	CS-137
5B		661.82			35.	46.4	
6C	1592.53	795.69	1.55	258.	3769.	4.0	CS-134
7C	1604.74	801.80	1.55	227.	359.	14.3	CS-134
8	2347.09	1173.10	1.74	186.	4807.	3.0	CO-60
9	2665.49	1332.42	1.97	37.	4508.	3.0	CO-60
10	2731.21	1365.31	2.48	13.	101.	22.6	CS-134
11	2921.74	1460.68	2.12	11.	187.	15.5	K-40
11B		1461.77			182.	11.2	

ERROR QUOTATION AT 1.96 SIGMA  
 PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011

BACKGROUND DESCRIPTION: BK0011

BACKGROUND COLLECT STARTED ON 10-JAN-85 AT 12:00:00

BACKGROUND LIVE TIME: 6000. SECONDS

222-S COUNTING ROOM

27-AUG-90 13:08:43

SAMPLE: F421 SEG F

DATA COLLECTED ON 14-MAR-90 AT 11:00:58

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

## R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI			ENERGY COMPARISON	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	(KEV) EXPECT
AC-228	LLD<7.86E-01		LLD<7.86E-01		911.07
AG-108M	LLD<1.96E-01		LLD<1.96E-01		433.94
AG-110M	LLD<8.94E-01		LLD<8.94E-01		657.76
AM-241	LLD<8.34E-01		LLD<8.34E-01		59.54
AM-243	LLD<2.10E-01		LLD<2.10E-01		74.67
AR-41	LLD<1.48E-01		LLD<1.48E-01		1293.64
AU-198	LLD<1.70E-01		LLD<1.70E-01		411.80
BA-133	LLD<2.57E-01		LLD<2.57E-01		356.02
BA-139	LLD<5.05E-01		LLD<5.05E-01		165.85
BA-140	LLD<7.04E-01		LLD<7.04E-01		537.27
BA-141	LLD<5.12E-01		LLD<5.12E-01		190.23
BE-7	LLD<1.78E+00		LLD<1.78E+00		477.59
BI-207	LLD<1.69E-01		LLD<1.69E-01		569.70
BI-212	LLD<2.47E+00		LLD<2.47E+00		727.27
BI-214	1.70E-01	+-1.58E-01	1.70E-01	+-1.58E-01	609.32 -0.14
CD-109	LLD<3.08E+00		LLD<3.08E+00		88.03
CE-139	LLD<1.14E-01		LLD<1.14E-01		165.85
CE-141	LLD<1.77E-01		LLD<1.77E-01		145.44
CEPR144	LLD<1.51E+00		LLD<1.51E+00		133.51
CO-56	LLD<1.88E-01		LLD<1.88E-01		846.76
CO-57	LLD<9.58E-02		LLD<9.58E-02		122.06
CO-58	LLD<1.83E-01		LLD<1.83E-01		810.75
CO-60	2.14E+01	+-6.73E-01	2.14E+01	+-6.73E-01	1332.50 -0.08 1173.24 -0.14
CR-51	LLD<1.38E+00		LLD<1.38E+00		320.09
CS-134	1.36E+01	+-5.63E-01	1.36E+01	+-5.63E-01	795.84 -0.15 604.70 -0.07
CS-136	LLD<1.85E-01		LLD<1.85E-01		818.51
CS-137	2.85E+01	+-7.04E-01	2.85E+01	+-7.04E-01	661.65 -0.10
CS-138	LLD<1.38E-01		LLD<1.38E-01		1435.86
EU-152	LLD<3.23E-01		LLD<3.23E-01		1408.01
EU-154	LLD<3.09E-01		LLD<3.09E-01		1274.45
EU-155	LLD<3.73E-01		LLD<3.73E-01		105.31
FE-59	LLD<4.20E-01		LLD<4.20E-01		1099.25
HF-181	LLD<1.95E-01		LLD<1.95E-01		482.20
HG-203	LLD<1.60E-01		LLD<1.60E-01		279.20
I-131	LLD<1.97E-01		LLD<1.97E-01		364.48
I-132	LLD<2.60E-01		LLD<2.60E-01		667.69
I-133	LLD<1.90E-01		LLD<1.90E-01		529.69
I-134	LLD<2.70E-01		LLD<2.70E-01		847.03
I-135	LLD<4.06E-01		LLD<4.06E-01		1260.41
K-40	LLD<1.90E+00		LLD<1.90E+00		1460.75
KR-85	LLD<4.08E+01		LLD<4.08E+01		513.99
KR-85M	LLD<1.12E-01		LLD<1.12E-01		151.17
KR-87	LLD<4.37E-01		LLD<4.37E-01		402.58
KR-89	LLD<6.52E+00		LLD<6.52E+00		220.90
LA-140	LLD<7.35E-02		LLD<7.35E-02		1596.20

LA-142	LLD<3.84E-01	LLD<3.84E-01	641.83
MN-54	LLD<1.75E-01	LLD<1.75E-01	834.83
MN-56	LLD<2.12E-01	LLD<2.12E-01	846.76
NA-22	LLD<1.03E-01	LLD<1.03E-01	1274.55
NA-24	LLD<1.68E-01	LLD<1.68E-01	1368.60
NB-94	LLD<1.59E-01	LLD<1.59E-01	702.63
NB-95	LLD<1.60E-01	LLD<1.60E-01	765.78
NB-97	LLD<1.08E+00	LLD<1.08E+00	657.92
NP-238	LLD<8.25E-01	LLD<8.25E-01	984.45
NP-239	LLD<8.99E-01	LLD<8.99E-01	277.60
PA-233	LLD<4.03E-01	LLD<4.03E-01	311.98
PA-234M	LLD<3.46E+01	LLD<3.46E+01	1001.03
PB-210	LLD<4.65E+00	LLD<4.65E+00	465.03
PB-212	LLD<2.86E-01	LLD<2.86E-01	239.00
PB-214	LLD<4.25E-01	LLD<4.25E-01	351.92
PO-210	LLD<1.64E+04	LLD<1.64E+04	804.00
PO-214	LLD<6.88E+03	LLD<6.88E+03	799.70
PO-216	LLD<1.32E+04	LLD<1.32E+04	804.90
PU-239	LLD<1.30E+03	LLD<1.30E+03	129.30
PU-241	LLD<4.57E+04	LLD<4.57E+04	148.57
RA-224	LLD<3.12E+00	LLD<3.12E+00	240.99
RA-226	LLD<2.72E+00	LLD<2.72E+00	186.10
RB-88	LLD<6.32E-01	LLD<6.32E-01	1836.00
RB-89	LLD<9.12E-01	LLD<9.12E-01	1031.88
RN-220	LLD<1.46E+02	LLD<1.46E+02	549.73
RU-103	LLD<1.78E-01	LLD<1.78E-01	497.08
RURH106	LLD<3.28E+00	LLD<3.28E+00	621.80
SB-124	LLD<3.08E-01	LLD<3.08E-01	602.72
SB-125	LLD<1.46E+00	LLD<1.46E+00	176.33
SC-46	LLD<2.22E-01	LLD<2.22E-01	1120.45
SE-75	LLD<2.20E-01	LLD<2.20E-01	264.66
SN-113	LLD<2.49E-01	LLD<2.49E-01	391.67
SR-85	LLD<1.79E-01	LLD<1.79E-01	513.99
SR-91	LLD<3.03E-01	LLD<3.03E-01	555.60
SR-92	LLD<7.70E-02	LLD<7.70E-02	1383.94
TA-182	LLD<6.21E-01	LLD<6.21E-01	1121.30
TC-99M	LLD<1.02E-01	LLD<1.02E-01	140.51
TE-123M	LLD<1.09E-01	LLD<1.09E-01	159.00
TE-125M	LLD<2.77E+01	LLD<2.77E+01	109.27
TE-132	LLD<1.34E-01	LLD<1.34E-01	228.16
TH-228	LLD<9.61E+00	LLD<9.61E+00	84.37
TL-208	LLD<2.18E-01	LLD<2.18E-01	583.14
U-235	LLD<1.81E-01	LLD<1.81E-01	185.71
U-237	LLD<5.53E-01	LLD<5.53E-01	208.00
W-187	LLD<5.51E-01	LLD<5.51E-01	685.74
XE-131M	LLD<4.72E+00	LLD<4.72E+00	163.98
XE-133	LLD<3.42E-01	LLD<3.42E-01	81.00
XE-133M	LLD<1.18E+00	LLD<1.18E+00	233.21
XE-135	LLD<1.44E-01	LLD<1.44E-01	249.79
XE-138	LLD<1.09E+00	LLD<1.09E+00	258.41
Y-88	LLD<6.00E-02	LLD<6.00E-02	1836.06
Y-91	LLD<4.84E+01	LLD<4.84E+01	1204.90
Y-91M	LLD<2.29E-01	LLD<2.29E-01	555.60
ZN-65	LLD<4.36E-01	LLD<4.36E-01	1115.55
ZR-95	LLD<3.02E-01	LLD<3.02E-01	756.73
ZR-97	LLD<1.59E-01	LLD<1.59E-01	743.33

TOTAL      6.37E+01 +-1.14E+00      6.37E+01 +-1.14E+00

STANDARD DEVIATION = 0.04

EBAR = \*\*\*\*\* MEV/DISINTEGRATION  
MAXIMUM PERMISSABLE ACTIVITY = 1.44E-09 UC/LI  
TOTAL MEASURED ACTIVITY = 6.37E+01 (+-1.14E+00) UC/LI  
% TECH. SPEC. = \*\*\*\*\* (+-\*\*\*\*\*)

ERROR QUOTATION AT 1.96 SIGMA  
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1127.46	563.20	456.	13.9	1.95E+01
1139.52	569.23	822.	12.2	3.55E+01
1604.74	801.80	359.	14.3	2.06E+01
2731.21	1365.31	101.	22.6	9.06E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2921.74	1460.68	187.	15.5	1.77E+01

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\*       G A M M A   S P E C T R U M   A N A L Y S I S                   \*  
\*  
\*\*\*\*\*

CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM

27-AUG-90 13:13:16

A N A L Y S I S   P A R A M E T E R S

MCA UNIT NUMBER: 2   /    ADC UNIT NUMBER: 1.0  
DETECTOR NUMBER: 1   /    GEOMETRY NUMBER: 42  
SPECTRUM SIZE: 4096 CHANNELS  
ORDER OF SMOOTHING FUNCTION: 5  
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK  
PEAK CONFIDENCE FACTOR: 85.0%  
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV  
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED

LLD CALCULATION PERFORMED

MEASURED ENERGY DIFFERENCES LISTED

MULTIPLLET ANALYSIS PERFORMED

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD1071

ANALYZED BY:           JLA

SAMPLE DESCRIPTION: F-436 SEGMENT-U

GEOMETRY DESCRIPTION:

SAMPLE SIZE: 1.0000E-01 LI           / CONVERSION FACTOR: 1.0000E+00

STANDARD SIZE: 1.0000E+00 EA

ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 14-MAR-90 AT 12:26:23

COLLECT LIVE TIME:   3000. SECONDS

REAL TIME:   3001. SECONDS

DEAD TIME:   0.03 %

DECAYED TO   0. DAYS,  0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 23-NOV-89

EFFICIENCY CALIBRATION PERFORMED 2-MAR-89

## P E A K   A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	1324.38	661.63	1.53	40.	52.	45.6	CS-137
1B		661.82			35.	46.4	
2	2922.13	1460.87	2.07	8.	194.	14.8	K-40
2B		1461.77			182.	11.2	

ERROR QUOTATION AT 1.96 SIGMA  
PEAK CONFIDENCE LEVEL AT 85.0%

## B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011  
BACKGROUND DESCRIPTION: BK0011  
BACKGROUND COLLECT STARTED ON 10-JAN-85 AT 12:00:00  
BACKGROUND LIVE TIME: 6000. SECONDS

222-S COUNTING ROOM

27-AUG-90 13:13:16

SAMPLE: F-436 SEGMENT-U

DATA COLLECTED ON 14-MAR-90 AT 12:26:23

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

## RADIONUCLIDE ANALYSIS REPORT

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI			ENERGY COMPARISON (KEV)		
	MEASURED	ERROR	DECAY CORRECTED	ERROR	EXPECT	DIFF
AC-228	LLD<1.24E-03		LLD<1.24E-03		911.07	
AG-108M	LLD<2.52E-04		LLD<2.52E-04		433.94	
AG-110M	LLD<4.41E-04		LLD<4.41E-04		657.76	
AM-241	LLD<1.52E-03		LLD<1.52E-03		59.54	
AM-243	LLD<4.29E-04		LLD<4.29E-04		74.67	
AR-41	LLD<3.67E-04		LLD<3.67E-04		1293.64	
AU-198	LLD<2.12E-04		LLD<2.12E-04		411.80	
BA-133	LLD<4.21E-04		LLD<4.21E-04		356.02	
BA-139	LLD<9.27E-04		LLD<9.27E-04		165.85	
BA-140	LLD<8.81E-04		LLD<8.81E-04		537.27	
BA-141	LLD<9.08E-04		LLD<9.08E-04		190.23	
BE-7	LLD<2.21E-03		LLD<2.21E-03		477.59	
BI-207	LLD<2.47E-04		LLD<2.47E-04		569.70	
BI-212	LLD<3.74E-03		LLD<3.74E-03		727.27	
BI-214	LLD<8.46E-04		LLD<8.46E-04		609.32	
CD-109	LLD<5.88E-03		LLD<5.88E-03		88.03	
CE-139	LLD<2.10E-04		LLD<2.10E-04		165.85	
CE-141	LLD<3.38E-04		LLD<3.38E-04		145.44	
CEPR144	LLD<2.82E-03		LLD<2.82E-03		133.51	
CO-56	LLD<2.05E-04		LLD<2.05E-04		846.76	
CO-57	LLD<1.79E-04		LLD<1.79E-04		122.06	
CO-58	LLD<2.81E-04		LLD<2.81E-04		810.75	
CO-60	LLD<3.73E-04		LLD<3.73E-04		1332.50	
CR-51	LLD<2.03E-03		LLD<2.03E-03		320.09	
CS-134	LLD<3.00E-04		LLD<3.00E-04		795.84	
CS-136	LLD<2.68E-04		LLD<2.68E-04		818.51	
CS-137	LLD<4.81E-04		LLD<4.81E-04		661.65	
CS-138	LLD<7.32E-04		LLD<7.32E-04		1435.86	
EU-152	LLD<1.04E-03		LLD<1.04E-03		1408.01	
EU-154	LLD<1.01E-03		LLD<1.01E-03		1274.45	
EU-155	LLD<7.24E-04		LLD<7.24E-04		105.31	
FE-59	LLD<4.30E-04		LLD<4.30E-04		1099.25	
HF-181	LLD<2.61E-04		LLD<2.61E-04		482.20	
HG-203	LLD<2.61E-04		LLD<2.61E-04		279.20	
I-131	LLD<2.93E-04		LLD<2.93E-04		364.48	
I-132	LLD<2.98E-04		LLD<2.98E-04		667.69	
I-133	LLD<2.29E-04		LLD<2.29E-04		529.69	
I-134	LLD<3.08E-04		LLD<3.08E-04		847.03	
I-135	LLD<1.49E-03		LLD<1.49E-03		1260.41	
K-40	LLD<9.27E-03		LLD<9.27E-03		1460.75	
KR-85	LLD<7.79E-02		LLD<7.79E-02		513.99	
KR-85M	LLD<2.17E-04		LLD<2.17E-04		151.17	
KR-87	LLD<5.54E-04		LLD<5.54E-04		402.58	
KR-89	LLD<1.15E-02		LLD<1.15E-02		220.90	
LA-140	LLD<4.13E-04		LLD<4.13E-04		1596.20	
LA-142	LLD<6.29E-04		LLD<6.29E-04		641.83	
MN-54	LLD<2.72E-04		LLD<2.72E-04		834.83	

MN-56	LLD<2.31E-04	LLD<2.31E-04	846.76
NA-22	LLD<3.24E-04	LLD<3.24E-04	1274.55
NA-24	LLD<3.15E-04	LLD<3.15E-04	1368.60
NB-94	LLD<3.18E-04	LLD<3.18E-04	702.63
NB-95	LLD<2.93E-04	LLD<2.93E-04	765.78
NB-97	LLD<5.34E-04	LLD<5.34E-04	657.92
NP-238	LLD<1.38E-03	LLD<1.38E-03	984.45
NP-239	LLD<1.46E-03	LLD<1.46E-03	277.60
PA-233	LLD<6.42E-04	LLD<6.42E-04	311.98
PA-234M	LLD<5.40E-02	LLD<5.40E-02	1001.03
PB-210	LLD<6.01E-03	LLD<6.01E-03	465.03
PB-212	LLD<4.55E-04	LLD<4.55E-04	239.00
PB-214	LLD<6.66E-04	LLD<6.66E-04	351.92
PO-210	LLD<2.27E+01	LLD<2.27E+01	804.00
PO-214	LLD<2.22E+00	LLD<2.22E+00	799.70
PO-216	LLD<1.39E+01	LLD<1.39E+01	804.90
PU-239	LLD<2.35E+00	LLD<2.35E+00	129.30
PU-241	LLD<8.31E+01	LLD<8.31E+01	148.57
RA-224	LLD<5.60E-03	LLD<5.60E-03	240.99
RA-226	LLD<4.92E-03	LLD<4.92E-03	186.10
RB-88	LLD<1.98E-03	LLD<1.98E-03	1836.00
RB-89	LLD<1.01E-03	LLD<1.01E-03	1031.88
RN-220	LLD<2.10E-01	LLD<2.10E-01	549.73
RU-103	LLD<2.45E-04	LLD<2.45E-04	497.08
RURH106	LLD<5.76E-03	LLD<5.76E-03	621.80
SB-124	LLD<2.54E-04	LLD<2.54E-04	602.72
SB-125	LLD<2.64E-03	LLD<2.64E-03	176.33
SC-46	LLD<3.04E-04	LLD<3.04E-04	1120.45
SE-75	LLD<3.31E-04	LLD<3.31E-04	264.66
SN-113	LLD<3.25E-04	LLD<3.25E-04	391.67
SR-85	LLD<3.42E-04	LLD<3.42E-04	513.99
SR-91	LLD<4.47E-04	LLD<4.47E-04	555.60
SR-92	LLD<5.12E-04	LLD<5.12E-04	1383.94
TA-182	LLD<9.06E-04	LLD<9.06E-04	1121.30
TC-99M	LLD<1.87E-04	LLD<1.87E-04	140.51
TE-123M	LLD<2.02E-04	LLD<2.02E-04	159.00
TE-125M	LLD<4.76E-02	LLD<4.76E-02	109.27
TE-132	LLD<2.38E-04	LLD<2.38E-04	228.16
TH-228	LLD<1.86E-02	LLD<1.86E-02	84.37
TL-208	LLD<2.78E-04	LLD<2.78E-04	583.14
U-235	LLD<3.30E-04	LLD<3.30E-04	185.71
U-237	LLD<9.03E-04	LLD<9.03E-04	208.00
W-187	LLD<9.68E-04	LLD<9.68E-04	685.74
XE-131M	LLD<9.89E-03	LLD<9.89E-03	163.98
XE-133	LLD<7.16E-04	LLD<7.16E-04	81.00
XE-133M	LLD<2.05E-03	LLD<2.05E-03	233.21
XE-135	LLD<2.36E-04	LLD<2.36E-04	249.79
XE-138	LLD<1.79E-03	LLD<1.79E-03	258.41
Y-88	LLD<1.88E-04	LLD<1.88E-04	1836.06
Y-91	LLD<1.39E-01	LLD<1.39E-01	1204.90
Y-91M	LLD<3.38E-04	LLD<3.38E-04	555.60
ZN-65	LLD<7.69E-04	LLD<7.69E-04	1115.55
ZR-95	LLD<4.59E-04	LLD<4.59E-04	756.73
ZR-97	LLD<3.07E-04	LLD<3.07E-04	743.33

TOTAL      0.00E-01 +-0.00E-01      0.00E-01 +-0.00E-01

ERROR QUOTATION AT 1.96 SIGMA  
LLD CONFIDENCE LEVEL AT 85.0%

ALL DETECTED PEAKS WERE USED IN THE ANALYSIS

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1324.38	661.63	52.	45.6	2.55E+00
2922.13	1460.87	194.	14.8	1.84E+01

# CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM

29-AUG-90 08:02:36

## ANALYSIS PARAMETERS

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 1.0  
DETECTOR NUMBER: 1 / GEOMETRY NUMBER: 42  
SPECTRUM SIZE: 4096 CHANNELS  
ORDER OF SMOOTHING FUNCTION: 5  
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK  
PEAK CONFIDENCE FACTOR: 85.0%  
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV  
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

## ENVIRONMENTAL BACKGROUND SUBTRACTED LID CALCULATION PERFORMED

LED CALCULATION PERFORMED  
MEASURED ENERGY DIFFERENCE

## MEASURED ENERGY DIFFERENCES LISTED MULTIPLLET ANALYSIS PERFORMED

## MULTIPLET ANALYSIS PERFORMED

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD1077  
ANALYZED BY: EMB

SAMPLE DESCRIPTION: F470

**GEOMETRY DESCRIPTION:**

SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 2.5000E-02

STANDARD SIZE: 1.0000E+00 EA

ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 14-MAR-90 AT 19:33:21

COLLECT LIVE TIME: 3000. SECONDS  
REAL TIME: 3001. SECONDS  
DEAD TIME: 0.03 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 23-NOV-89

EFFICIENCY CALIBRATION PERFORMED 2-MAR-89

222-S COUNTING ROOM

29-AUG-90 08:02:36

P E A K   A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	1324.27	661.58	1.50	45.	1129.	6.1	CS-137
1B		661.82			35.	46.4	
2	2922.71	1461.16	2.10	3.	185.	14.7	K-40
2B		1461.77			182.	11.2	

ERROR QUOTATION AT 1.96 SIGMA  
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011

BACKGROUND DESCRIPTION: BK0011

BACKGROUND COLLECT STARTED ON 10-JAN-85 AT 12:00:00

BACKGROUND LIVE TIME: 6000. SECONDS

222-S COUNTING ROOM

29-AUG-90 08:02:36

SAMPLE: F470

DATA COLLECTED ON 14-MAR-90 AT 19:33:21

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

## R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI			ENERGY COMPARISON (KEV)		
	MEASURED	ERROR	DECAY CORRECTED	ERROR	EXPECT	DIFF
AC-228	LLD<4.77E+00		LLD<4.77E+00		911.07	
AG-108M	LLD<1.39E+00		LLD<1.39E+00		433.94	
AG-110M	LLD<6.23E+00		LLD<6.23E+00		657.76	
AM-241	LLD<8.69E+00		LLD<8.69E+00		59.54	
AM-243	LLD<2.59E+00		LLD<2.59E+00		74.67	
AR-41	LLD<1.39E+00		LLD<1.39E+00		1293.64	
AU-198	LLD<1.21E+00		LLD<1.21E+00		411.80	
BA-133	LLD<2.22E+00		LLD<2.22E+00		356.02	
BA-139	LLD<5.15E+00		LLD<5.15E+00		165.85	
BA-140	LLD<4.90E+00		LLD<4.90E+00		537.27	
BA-141	LLD<5.07E+00		LLD<5.07E+00		190.23	
BE-7	LLD<1.25E+01		LLD<1.25E+01		477.59	
BI-207	LLD<1.16E+00		LLD<1.16E+00		569.70	
BI-212	LLD<1.92E+01		LLD<1.92E+01		727.27	
BI-214	LLD<3.45E+00		LLD<3.45E+00		609.32	
CD-109	LLD<3.78E+01		LLD<3.78E+01		88.03	
CE-139	LLD<1.17E+00		LLD<1.17E+00		165.85	
CE-141	LLD<1.79E+00		LLD<1.79E+00		145.44	
CEPR144	LLD<1.61E+01		LLD<1.61E+01		133.51	
CO-56	LLD<1.19E+00		LLD<1.19E+00		846.76	
CO-57	LLD<1.05E+00		LLD<1.05E+00		122.06	
CO-58	LLD<9.41E-01		LLD<9.41E-01		810.75	
CO-60	LLD<1.21E+00		LLD<1.21E+00		1332.50	
CR-51	LLD<1.07E+01		LLD<1.07E+01		320.09	
CS-134	LLD<1.08E+00		LLD<1.08E+00		795.84	
CS-136	LLD<1.31E+00		LLD<1.31E+00		818.51	
CS-137	6.79E+01	+-4.47E+00	6.79E+01	+-4.47E+00	661.65	-0.07
CS-138	LLD<2.57E+00		LLD<2.57E+00		1435.86	
EU-152	LLD<5.66E+00		LLD<5.66E+00		1408.01	
EU-154	LLD<4.04E+00		LLD<4.04E+00		1274.45	
EU-155	LLD<4.42E+00		LLD<4.42E+00		105.31	
FE-59	LLD<2.59E+00		LLD<2.59E+00		1099.25	
HF-181	LLD<1.54E+00		LLD<1.54E+00		482.20	
HG-203	LLD<1.28E+00		LLD<1.28E+00		279.20	
I-131	LLD<1.46E+00		LLD<1.46E+00		364.48	
I-132	LLD<1.88E+00		LLD<1.88E+00		667.69	
I-133	LLD<1.38E+00		LLD<1.38E+00		529.69	
I-134	LLD<1.70E+00		LLD<1.70E+00		847.03	
I-135	LLD<4.92E+00		LLD<4.92E+00		1260.41	
K-40	LLD<3.62E+01		LLD<3.62E+01		1460.75	
KR-85	LLD<3.95E+02		LLD<3.95E+02		513.99	
KR-85M	LLD<1.19E+00		LLD<1.19E+00		151.17	
KR-87	LLD<3.13E+00		LLD<3.13E+00		402.58	
KR-89	LLD<5.60E+01		LLD<5.60E+01		220.90	
LA-140	LLD<1.37E+00		LLD<1.37E+00		1596.20	
LA-142	LLD<2.89E+00		LLD<2.89E+00		641.83	
MN-54	LLD<1.12E+00		LLD<1.12E+00		834.83	

MN-56	LLD<1.34E+00	LLD<1.34E+00	846.76
NA-22	LLD<1.35E+00	LLD<1.35E+00	1274.55
NA-24	LLD<1.26E+00	LLD<1.26E+00	1368.60
NB-94	LLD<1.06E+00	LLD<1.06E+00	702.63
NB-95	LLD<9.45E-01	LLD<9.45E-01	765.78
NB-97	LLD<7.55E+00	LLD<7.55E+00	657.92
NP-238	LLD<3.38E+00	LLD<3.38E+00	984.45
NP-239	LLD<7.18E+00	LLD<7.18E+00	277.60
PA-233	LLD<3.17E+00	LLD<3.17E+00	311.98
PA-234M	LLD<2.90E+02	LLD<2.90E+02	1001.03
PB-210	LLD<3.55E+01	LLD<3.55E+01	465.03
PB-212	LLD<2.51E+00	LLD<2.51E+00	239.00
PB-214	LLD<3.16E+00	LLD<3.16E+00	351.92
PO-210	LLD<7.62E+04	LLD<7.62E+04	804.00
PO-214	LLD<1.09E+04	LLD<1.09E+04	799.70
PO-216	LLD<6.39E+04	LLD<6.39E+04	804.90
PU-239	LLD<1.34E+04	LLD<1.34E+04	129.30
PU-241	LLD<4.66E+05	LLD<4.66E+05	148.57
RA-224	LLD<2.72E+01	LLD<2.72E+01	240.99
RA-226	LLD<2.44E+01	LLD<2.44E+01	186.10
RB-88	LLD<1.44E+01	LLD<1.44E+01	1836.00
RB-89	LLD<5.37E+00	LLD<5.37E+00	1031.88
RN-220	LLD<9.88E+02	LLD<9.88E+02	549.73
RU-103	LLD<1.32E+00	LLD<1.32E+00	497.08
RURH106	LLD<2.05E+01	LLD<2.05E+01	621.80
SB-124	LLD<8.92E-01	LLD<8.92E-01	602.72
SB-125	LLD<1.35E+01	LLD<1.35E+01	176.33
SC-46	LLD<1.21E+00	LLD<1.21E+00	1120.45
SE-75	LLD<1.62E+00	LLD<1.62E+00	264.66
SN-113	LLD<1.76E+00	LLD<1.76E+00	391.67
SR-85	LLD<1.73E+00	LLD<1.73E+00	513.99
SR-91	LLD<2.26E+00	LLD<2.26E+00	555.60
SR-92	LLD<1.64E+00	LLD<1.64E+00	1383.94
TA-182	LLD<3.48E+00	LLD<3.48E+00	1121.30
TC-99M	LLD<1.01E+00	LLD<1.01E+00	140.51
TE-123M	LLD<1.03E+00	LLD<1.03E+00	159.00
TE-125M	LLD<3.26E+02	LLD<3.26E+02	109.27
TE-132	LLD<1.13E+00	LLD<1.13E+00	228.16
TH-228	LLD<1.11E+02	LLD<1.11E+02	84.37
TL-208	LLD<1.26E+00	LLD<1.26E+00	583.14
U-235	LLD<1.66E+00	LLD<1.66E+00	185.71
U-237	LLD<4.96E+00	LLD<4.96E+00	208.00
W-187	LLD<4.09E+00	LLD<4.09E+00	685.74
XE-131M	LLD<4.76E+01	LLD<4.76E+01	163.98
XE-133	LLD<4.25E+00	LLD<4.25E+00	81.00
XE-133M	LLD<1.08E+01	LLD<1.08E+01	233.21
XE-135	LLD<1.14E+00	LLD<1.14E+00	249.79
XE-138	LLD<8.80E+00	LLD<8.80E+00	258.41
Y-88	LLD<1.36E+00	LLD<1.36E+00	1836.06
Y-91	LLD<4.97E+02	LLD<4.97E+02	1204.90
Y-91M	LLD<1.71E+00	LLD<1.71E+00	555.60
ZN-65	LLD<3.15E+00	LLD<3.15E+00	1115.55
ZR-95	LLD<1.98E+00	LLD<1.98E+00	756.73
ZR-97	LLD<1.09E+00	LLD<1.09E+00	743.33

TOTAL      6.79E+01 +-4.47E+00      6.79E+01 +-4.47E+00

E BAR = \*\*\*\*\* MEV/DISINTEGRATION

MAXIMUM PERMISSABLE ACTIVITY = 1.16E-08 UC/LI

TOTAL MEASURED ACTIVITY = 6.79E+01 (+-4.47E+00) UC/LI

% TECH. SPEC. = \*\*\*\*\* (+-\*\*\*\*)

ERROR QUOTATION AT 1.96 SIGMA  
LLD CONFIDENCE LEVEL AT 85.0%

ALL DETECTED PEAKS WERE USED IN THE ANALYSIS

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
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2922.71	1461.16	185.	14.7	1.75E+01
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\*        G A M M A    S P E C T R U M    A N A L Y S I S    \*  
\*  
\* \*

CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM

29-AUG-90 08:07:31

A N A L Y S I S    P A R A M E T E R S

MCA UNIT NUMBER: 2    /    ADC UNIT NUMBER: 1.0  
DETECTOR NUMBER: 1    /    GEOMETRY NUMBER: 42  
SPECTRUM SIZE: 4096 CHANNELS  
ORDER OF SMOOTHING FUNCTION: 5  
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK  
PEAK CONFIDENCE FACTOR: 85.0%  
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV  
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED

LLD CALCULATION PERFORMED

MEASURED ENERGY DIFFERENCES LISTED

MULTIPLET ANALYSIS PERFORMED

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD1079

ANALYZED BY:            EMB

SAMPLE DESCRIPTION: F471

GEOMETRY DESCRIPTION:

SAMPLE SIZE: 1.0000E-03 LI            / CONVERSION FACTOR: 2.5000E-02

STANDARD SIZE: 1.0000E+00 EA

ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 14-MAR-90 AT 21:47:50

COLLECT LIVE TIME:    3000. SECONDS

REAL TIME:    3001. SECONDS

DEAD TIME:    0.03 %

DECAYED TO    0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 23-NOV-89

EFFICIENCY CALIBRATION PERFORMED 2-MAR-89

222-S COUNTING ROOM

29-AUG-90 08:07:31

P E A K   A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1\$	93.35	46.58	2.27	238.	53.	95.7	PU-240, EU-155
2\$	99.70	49.75	2.27	372.	36.	96.4	U-234
3	1324.26	661.57	1.46	47.	1301.	5.7	CS-137
3B		661.82			35.	46.4	
4	2922.43	1461.03	2.09	8.	169.	16.0	K-40
4B		1461.77			182.	11.2	

ERROR QUOTATION AT 1.96 SIGMA  
PEAK CONFIDENCE LEVEL AT 85.0%

\$ - MULTIPLET ANALYSIS CONVERGED DUE TO LACK OF CHI-SQ IMPROVEMENT  
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011

BACKGROUND DESCRIPTION: BK0011

BACKGROUND COLLECT STARTED ON 10-JAN-85 AT 12:00:00

BACKGROUND LIVE TIME: 6000. SECONDS

222-S COUNTING ROOM

29-AUG-90 08:07:31

SAMPLE: F471

DATA COLLECTED ON 14-MAR-90 AT 21:47:50

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

## R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI			ENERGY COMPARISON (KEV)	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	EXPECT
AC-228	LLD<3.46E+00		LLD<3.46E+00		911.07
AG-108M	LLD<1.49E+00		LLD<1.49E+00		433.94
AG-110M	LLD<6.67E+00		LLD<6.67E+00		657.76
AM-241	LLD<9.14E+00		LLD<9.14E+00		59.54
AM-243	LLD<2.79E+00		LLD<2.79E+00		74.67
AR-41	LLD<1.22E+00		LLD<1.22E+00		1293.64
AU-198	LLD<1.21E+00		LLD<1.21E+00		411.80
BA-133	LLD<2.25E+00		LLD<2.25E+00		356.02
BA-139	LLD<5.18E+00		LLD<5.18E+00		165.85
BA-140	LLD<5.33E+00		LLD<5.33E+00		537.27
BA-141	LLD<4.70E+00		LLD<4.70E+00		190.23
BE-7	LLD<1.15E+01		LLD<1.15E+01		477.59
BI-207	LLD<1.00E+00		LLD<1.00E+00		569.70
BI-212	LLD<1.79E+01		LLD<1.79E+01		727.27
BI-214	LLD<3.89E+00		LLD<3.89E+00		609.32
CD-109	LLD<3.85E+01		LLD<3.85E+01		88.03
CE-139	LLD<1.17E+00		LLD<1.17E+00		165.85
CE-141	LLD<1.85E+00		LLD<1.85E+00		145.44
CEPR144	LLD<1.66E+01		LLD<1.66E+01		133.51
CO-56	LLD<9.36E-01		LLD<9.36E-01		846.76
CO-57	LLD<1.11E+00		LLD<1.11E+00		122.06
CO-58	LLD<1.33E+00		LLD<1.33E+00		810.75
CO-60	LLD<1.49E+00		LLD<1.49E+00		1332.50
CR-51	LLD<1.20E+01		LLD<1.20E+01		320.09
CS-134	LLD<1.34E+00		LLD<1.34E+00		795.84
CS-136	LLD<1.16E+00		LLD<1.16E+00		818.51
CS-137	7.87E+01	+-4.78E+00	7.87E+01	+-4.78E+00	661.65 -0.08
CS-138	LLD<1.59E+00		LLD<1.59E+00		1435.86
EU-152	LLD<6.46E+00		LLD<6.46E+00		1408.01
EU-154	LLD<2.55E+00		LLD<2.55E+00		1274.45
EU-155	LLD<4.63E+00		LLD<4.63E+00		105.31
FE-59	LLD<2.59E+00		LLD<2.59E+00		1099.25
HF-181	LLD<1.56E+00		LLD<1.56E+00		482.20
HG-203	LLD<1.40E+00		LLD<1.40E+00		279.20
I-131	LLD<1.58E+00		LLD<1.58E+00		364.48
I-132	LLD<2.17E+00		LLD<2.17E+00		667.69
I-133	LLD<1.40E+00		LLD<1.40E+00		529.69
I-134	LLD<1.49E+00		LLD<1.49E+00		847.03
I-135	LLD<5.56E+00		LLD<5.56E+00		1260.41
K-40	LLD<3.82E+01		LLD<3.82E+01		1460.75
KR-85	LLD<3.78E+02		LLD<3.78E+02		513.99
KR-85M	LLD<1.18E+00		LLD<1.18E+00		151.17
KR-87	LLD<3.11E+00		LLD<3.11E+00		402.58
KR-89	LLD<5.84E+01		LLD<5.84E+01		220.90
LA-140	LLD<1.56E+00		LLD<1.56E+00		1596.20
LA-142	LLD<2.93E+00		LLD<2.93E+00		641.83
MN-54	LLD<1.06E+00		LLD<1.06E+00		834.83

MN-56	LLD<1.06E+00	LLD<1.06E+00	846.76
NA-22	LLD<7.56E-01	LLD<7.56E-01	1274.55
NA-24	LLD<1.42E+00	LLD<1.42E+00	1368.60
NB-94	LLD<1.15E+00	LLD<1.15E+00	702.63
NB-95	LLD<1.11E+00	LLD<1.11E+00	765.78
NB-97	LLD<8.08E+00	LLD<8.08E+00	657.92
NP-238	LLD<5.29E+00	LLD<5.29E+00	984.45
NP-239	LLD<7.75E+00	LLD<7.75E+00	277.60
PA-233	LLD<3.39E+00	LLD<3.39E+00	311.98
PA-234M	LLD<2.53E+02	LLD<2.53E+02	1001.03
PB-210	LLD<3.28E+01	LLD<3.28E+01	465.03
PB-212	LLD<2.54E+00	LLD<2.54E+00	239.00
PB-214	LLD<3.19E+00	LLD<3.19E+00	351.92
PO-210	LLD<1.01E+05	LLD<1.01E+05	804.00
PO-214	LLD<9.80E+03	LLD<9.80E+03	799.70
PO-216	LLD<5.84E+04	LLD<5.84E+04	804.90
PU-239	LLD<1.46E+04	LLD<1.46E+04	129.30
PU-241	LLD<4.80E+05	LLD<4.80E+05	148.57
RA-224	LLD<2.75E+01	LLD<2.75E+01	240.99
RA-226	LLD<2.70E+01	LLD<2.70E+01	186.10
RB-88	LLD<7.92E+00	LLD<7.92E+00	1836.00
RB-89	LLD<5.74E+00	LLD<5.74E+00	1031.88
RN-220	LLD<1.04E+03	LLD<1.04E+03	549.73
RU-103	LLD<1.31E+00	LLD<1.31E+00	497.08
RURH106	LLD<2.36E+01	LLD<2.36E+01	621.80
SB-124	LLD<1.26E+00	LLD<1.26E+00	602.72
SB-125	LLD<1.39E+01	LLD<1.39E+01	176.33
SC-46	LLD<1.53E+00	LLD<1.53E+00	1120.45
SE-75	LLD<1.77E+00	LLD<1.77E+00	264.66
SN-113	LLD<1.75E+00	LLD<1.75E+00	391.67
SR-85	LLD<1.66E+00	LLD<1.66E+00	513.99
SR-91	LLD<2.17E+00	LLD<2.17E+00	555.60
SR-92	LLD<1.06E+00	LLD<1.06E+00	1383.94
TA-182	LLD<3.33E+00	LLD<3.33E+00	1121.30
TC-99M	LLD<1.10E+00	LLD<1.10E+00	140.51
TE-123M	LLD<1.13E+00	LLD<1.13E+00	159.00
TE-125M	LLD<3.52E+02	LLD<3.52E+02	109.27
TE-132	LLD<1.23E+00	LLD<1.23E+00	228.16
TH-228	LLD<1.24E+02	LLD<1.24E+02	84.37
TL-208	LLD<1.30E+00	LLD<1.30E+00	583.14
U-235	LLD<1.80E+00	LLD<1.80E+00	185.71
U-237	LLD<4.82E+00	LLD<4.82E+00	208.00
W-187	LLD<4.44E+00	LLD<4.44E+00	685.74
XE-131M	LLD<4.65E+01	LLD<4.65E+01	163.98
XE-133	LLD<4.42E+00	LLD<4.42E+00	81.00
XE-133M	LLD<1.08E+01	LLD<1.08E+01	233.21
XE-135	LLD<1.23E+00	LLD<1.23E+00	249.79
XE-138	LLD<9.05E+00	LLD<9.05E+00	258.41
Y-88	LLD<7.52E-01	LLD<7.52E-01	1836.06
Y-91	LLD<4.65E+02	LLD<4.65E+02	1204.90
Y-91M	LLD<1.64E+00	LLD<1.64E+00	555.60
ZN-65	LLD<4.11E+00	LLD<4.11E+00	1115.55
ZR-95	LLD<2.16E+00	LLD<2.16E+00	756.73
ZR-97	LLD<1.14E+00	LLD<1.14E+00	743.33
TOTAL	7.87E+01 +-4.78E+00	7.87E+01 +-4.78E+00	

EBAR = \*\*\*\*\* MEV/DISINTEGRATION

MAXIMUM PERMISSABLE ACTIVITY = 1.16E-08 UC/LI

TOTAL MEASURED ACTIVITY = 7.87E+01 (+-4.78E+00) UC/LI

% TECH. SPEC. = \*\*\*\*\* (+-\*\*\*\*)

ERROR QUOTATION AT 1.96 SIGMA  
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
93.35	46.58	53.	95.7	7.80E+00
99.70	49.75	36.	96.4	4.05E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.43	1461.03	169.	16.0	1.60E+01

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\*        G A M M A    S P E C T R U M    A N A L Y S I S    \*  
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CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM

27-AUG-90 13:22:40

A N A L Y S I S    P A R A M E T E R S

MCA UNIT NUMBER: 2    /    ADC UNIT NUMBER: 1.0  
DETECTOR NUMBER: 1    /    GEOMETRY NUMBER: 42  
SPECTRUM SIZE: 4096 CHANNELS  
ORDER OF SMOOTHING FUNCTION: 5  
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK  
PEAK CONFIDENCE FACTOR: 85.0%  
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV  
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED

LLD CALCULATION PERFORMED

MEASURED ENERGY DIFFERENCES LISTED

MULTIPLET ANALYSIS PERFORMED

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD1084

ANALYZED BY: MAX

SAMPLE DESCRIPTION: F568

GEOMETRY DESCRIPTION:

SAMPLE SIZE: 1.0000E-03 LI    / CONVERSION FACTOR: 5.0000E-02

STANDARD SIZE: 1.0000E+00 EA

ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 15-MAR-90 AT 04:41:44

COLLECT LIVE TIME: 3000. SECONDS

REAL TIME: 3006. SECONDS

DEAD TIME: 0.20 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 23-NOV-89

EFFICIENCY CALIBRATION PERFORMED 2-MAR-89

222-S COUNTING ROOM

27-AUG-90 13:22:40

## P E A K   A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	1127.31	563.13	1.39	475.	428.	17.4	CS-134, EU-152
2C	1139.70	569.32	1.39	485.	740.	14.4	CS-134, BI-207
3	1210.36	604.64	1.47	520.	4961.	3.1	CS-134
4	1324.22	661.55	1.53	326.	13178.	1.8	CS-137
4B		661.82			35.	46.4	
5C	1592.50	795.68	1.50	258.	3527.	4.2	CS-134
6C	1604.72	801.79	1.50	246.	368.	13.7	CS-134
7	2347.08	1173.09	1.79	210.	4735.	3.0	CO-60
8	2665.49	1332.42	1.86	39.	4119.	3.1	CO-60
9	2730.86	1365.14	1.58	7.	99.	21.4	CS-134
10	2922.13	1460.87	2.48	10.	172.	16.0	K-40
10B		1461.77			182.	11.2	

ERROR QUOTATION AT 1.96 SIGMA  
 PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011  
 BACKGROUND DESCRIPTION: BK0011  
 BACKGROUND COLLECT STARTED ON 10-JAN-85 AT 12:00:00  
 BACKGROUND LIVE TIME: 6000. SECONDS

222-S COUNTING ROOM

27-AUG-90 13:22:40

SAMPLE: F568

DATA COLLECTED ON 15-MAR-90 AT 04:41:44

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

## RADIONUCLIDE ANALYSIS REPORT

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI			ENERGY COMPARISON	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	(KEV) EXPECT
AC-228	LLD<7.40E+00		LLD<7.40E+00		911.07
AG-108M	LLD<2.06E+00		LLD<2.06E+00		433.94
AG-110M	LLD<1.06E+01		LLD<1.06E+01		657.76
AM-241	LLD<8.73E+00		LLD<8.73E+00		59.54
AM-243	LLD<2.29E+00		LLD<2.29E+00		74.67
AR-41	LLD<1.23E+00		LLD<1.23E+00		1293.64
AU-198	LLD<1.86E+00		LLD<1.86E+00		411.80
BA-133	LLD<2.82E+00		LLD<2.82E+00		356.02
BA-139	LLD<5.43E+00		LLD<5.43E+00		165.85
BA-140	LLD<6.94E+00		LLD<6.94E+00		537.27
BA-141	LLD<5.59E+00		LLD<5.59E+00		190.23
BE-7	LLD<1.93E+01		LLD<1.93E+01		477.59
BI-207	LLD<1.78E+00		LLD<1.78E+00		569.70
BI-212	LLD<2.31E+01		LLD<2.31E+01		727.27
BI-214	LLD<1.01E+01		LLD<1.01E+01		609.32
CD-109	LLD<3.37E+01		LLD<3.37E+01		88.03
CE-139	LLD<1.23E+00		LLD<1.23E+00		165.85
CE-141	LLD<1.90E+00		LLD<1.90E+00		145.44
CEPR144	LLD<1.58E+01		LLD<1.58E+01		133.51
CO-56	LLD<1.78E+00		LLD<1.78E+00		846.76
CO-57	LLD<1.03E+00		LLD<1.03E+00		122.06
CO-58	LLD<1.76E+00		LLD<1.76E+00		810.75
CO-60	1.96E+02	+ -6.41E+00	1.96E+02	+ -6.41E+00	1332.50 -0.08
					1173.24 -0.15
CR-51	LLD<1.43E+01		LLD<1.43E+01		320.09
CS-134	1.27E+02	+ -5.53E+00	1.27E+02	+ -5.53E+00	795.84 -0.17
					604.70 -0.06
CS-136	LLD<1.79E+00		LLD<1.79E+00		818.51
CS-137	4.08E+02	+ -8.75E+00	4.08E+02	+ -8.75E+00	661.65 -0.10
CS-138	LLD<1.38E+00		LLD<1.38E+00		1435.86
EU-152	LLD<3.04E+00		LLD<3.04E+00		1408.01
EU-154	LLD<3.24E+00		LLD<3.24E+00		1274.45
EU-155	LLD<4.02E+00		LLD<4.02E+00		105.31
FE-59	LLD<4.53E+00		LLD<4.53E+00		1099.25
HF-181	LLD<2.13E+00		LLD<2.13E+00		482.20
HG-203	LLD<1.65E+00		LLD<1.65E+00		279.20
I-131	LLD<2.07E+00		LLD<2.07E+00		364.48
I-132	LLD<2.80E+00		LLD<2.80E+00		667.69
I-133	LLD<1.94E+00		LLD<1.94E+00		529.69
I-134	LLD<2.53E+00		LLD<2.53E+00		847.03
I-135	LLD<4.50E+00		LLD<4.50E+00		1260.41
K-40	LLD<1.85E+01		LLD<1.85E+01		1460.75
KR-85	LLD<4.26E+02		LLD<4.26E+02		513.99
KR-85M	LLD<1.22E+00		LLD<1.22E+00		151.17
KR-87	LLD<4.55E+00		LLD<4.55E+00		402.58
KR-89	LLD<6.73E+01		LLD<6.73E+01		220.90
LA-140	LLD<6.86E-01		LLD<6.86E-01		1596.20

LA-142	LLD<3.84E+00	LLD<3.84E+00	641.83
MN-54	LLD<1.73E+00	LLD<1.73E+00	834.83
MN-56	LLD<2.01E+00	LLD<2.01E+00	846.76
NA-22	LLD<1.07E+00	LLD<1.07E+00	1274.55
NA-24	LLD<1.50E+00	LLD<1.50E+00	1368.60
NB-94	LLD<1.58E+00	LLD<1.58E+00	702.63
NB-95	LLD<1.63E+00	LLD<1.63E+00	765.78
NB-97	LLD<1.28E+01	LLD<1.28E+01	657.92
NP-238	LLD<7.72E+00	LLD<7.72E+00	984.45
NP-239	LLD<9.48E+00	LLD<9.48E+00	277.60
PA-233	LLD<4.17E+00	LLD<4.17E+00	311.98
PA-234M	LLD<3.77E+02	LLD<3.77E+02	1001.03
PB-210	LLD<4.92E+01	LLD<4.92E+01	465.03
PB-212	LLD<3.06E+00	LLD<3.06E+00	239.00
PB-214	LLD<4.56E+00	LLD<4.56E+00	351.92
PO-210	LLD<1.62E+05	LLD<1.62E+05	804.00
PO-214	LLD<6.74E+04	LLD<6.74E+04	799.70
PO-216	LLD<1.36E+05	LLD<1.36E+05	804.90
PU-239	LLD<1.38E+04	LLD<1.38E+04	129.30
PU-241	LLD<4.87E+05	LLD<4.87E+05	148.57
RA-224	LLD<3.34E+01	LLD<3.34E+01	240.99
RA-226	LLD<2.90E+01	LLD<2.90E+01	186.10
RB-88	LLD<9.27E+00	LLD<9.27E+00	1836.00
RB-89	LLD<9.20E+00	LLD<9.20E+00	1031.88
RN-220	LLD<1.53E+03	LLD<1.53E+03	549.73
RU-103	LLD<1.87E+00	LLD<1.87E+00	497.08
RURH106	LLD<3.23E+01	LLD<3.23E+01	621.80
SB-124	LLD<3.09E+00	LLD<3.09E+00	602.72
SB-125	LLD<1.54E+01	LLD<1.54E+01	176.33
SC-46	LLD<2.20E+00	LLD<2.20E+00	1120.45
SE-75	LLD<2.27E+00	LLD<2.27E+00	264.66
SN-113	LLD<2.55E+00	LLD<2.55E+00	391.67
SR-85	LLD<1.87E+00	LLD<1.87E+00	513.99
SR-91	LLD<3.06E+00	LLD<3.06E+00	555.60
SR-92	LLD<1.10E+00	LLD<1.10E+00	1383.94
TA-182	LLD<6.32E+00	LLD<6.32E+00	1121.30
TC-99M	LLD<1.06E+00	LLD<1.06E+00	140.51
TE-123M	LLD<1.14E+00	LLD<1.14E+00	159.00
TE-125M	LLD<3.04E+02	LLD<3.04E+02	109.27
TE-132	LLD<1.44E+00	LLD<1.44E+00	228.16
TH-228	LLD<9.91E+01	LLD<9.91E+01	84.37
TL-208	LLD<2.21E+00	LLD<2.21E+00	583.14
U-235	LLD<1.94E+00	LLD<1.94E+00	185.71
U-237	LLD<5.64E+00	LLD<5.64E+00	208.00
W-187	LLD<5.34E+00	LLD<5.34E+00	685.74
XE-131M	LLD<5.26E+01	LLD<5.26E+01	163.98
XE-133	LLD<3.69E+00	LLD<3.69E+00	81.00
XE-133M	LLD<1.26E+01	LLD<1.26E+01	233.21
XE-135	LLD<1.48E+00	LLD<1.48E+00	249.79
XE-138	LLD<1.12E+01	LLD<1.12E+01	258.41
Y-88	LLD<8.79E-01	LLD<8.79E-01	1836.06
Y-91	LLD<4.23E+02	LLD<4.23E+02	1204.90
Y-91M	LLD<2.32E+00	LLD<2.32E+00	555.60
ZN-65	LLD<4.60E+00	LLD<4.60E+00	1115.55
ZR-95	LLD<3.07E+00	LLD<3.07E+00	756.73
ZR-97	LLD<1.49E+00	LLD<1.49E+00	743.33
TOTAL	7.31E+02 +-1.22E+01	7.31E+02 +-1.22E+01	

E BAR = \*\*\*\*\* MEV/DISINTEGRATION  
MAXIMUM PERMISSABLE ACTIVITY = 1.73E-09 UC/LI  
TOTAL MEASURED ACTIVITY = 7.31E+02 (+-1.22E+01) UC/LI  
% TECH. SPEC. = \*\*\*\*\* (+-\*\*\*\*\*)

ERROR QUOTATION AT 1.96 SIGMA  
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1127.31	563.13	428.	17.4	1.83E+01
1139.70	569.32	740.	14.4	3.20E+01
1604.72	801.79	368.	13.7	2.11E+01
2730.86	1365.14	99.	21.4	8.84E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.13	1460.87	172.	16.0	1.63E+01

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\*        G A M M A    S P E C T R U M    A N A L Y S I S    \*  
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CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM

27-AUG-90 13:28:16

A N A L Y S I S   P A R A M E T E R S

MCA UNIT NUMBER: 2    /    ADC UNIT NUMBER: 1.0  
DETECTOR NUMBER: 1    /    GEOMETRY NUMBER: 42  
SPECTRUM SIZE: 4096 CHANNELS  
ORDER OF SMOOTHING FUNCTION: 5  
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK  
PEAK CONFIDENCE FACTOR: 85.0%  
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV  
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED

LLD CALCULATION PERFORMED

MEASURED ENERGY DIFFERENCES LISTED

MULTIPLET ANALYSIS PERFORMED

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD1087

ANALYZED BY: MAX

SAMPLE DESCRIPTION: F569

GEOMETRY DESCRIPTION:

SAMPLE SIZE: 1.0000E-03 LI    . / CONVERSION FACTOR: 5.0000E-01

STANDARD SIZE: 1.0000E+00 EA

ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 15-MAR-90 AT 07:10:10

COLLECT LIVE TIME: 3254. SECONDS

REAL TIME: 199. SECONDS

DEAD TIME: -1535.18 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 23-NOV-89

EFFICIENCY CALIBRATION PERFORMED 2-MAR-89

## P E A K   A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	1127.55	563.25	1.38	459.	523.	12.7	CS-134, EU-152
2C	1139.64	569.29	1.38	494.	890.	11.4	CS-134, BI-207
3	1210.42	604.67	1.52	526.	5470.	2.9	CS-134
4	1324.31	661.60	1.59	393.	9861.	2.1	CS-137
4B		661.82			38.	46.4	
5C	1592.64	795.75	1.54	258.	3854.	4.0	CS-134
6C	1604.90	801.88	1.54	258.	405.	14.2	CS-134
7	2347.09	1173.10	1.83	230.	5233.	2.9	CO-60
8	2665.64	1332.50	1.90	72.	4671.	2.9	CO-60
9	2730.89	1365.15	1.76	20.	92.	25.4	CS-134
10	2922.37	1460.99	2.02	11.	178.	15.9	K-40
10B		1461.77			197.	11.2	

ERROR QUOTATION AT 1.96 SIGMA  
 PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011  
 BACKGROUND DESCRIPTION: BK0011  
 BACKGROUND COLLECT STARTED ON 10-JAN-85 AT 12:00:00  
 BACKGROUND LIVE TIME: 6000. SECONDS

222-S COUNTING ROOM

27-AUG-90 13:28:16

SAMPLE: F569

DATA COLLECTED ON 15-MAR-90 AT 07:10:10

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

## RADIONUCLIDE ANALYSIS REPORT

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI			ENERGY COMPARISON (KEV)		
	MEASURED	ERROR	DECAY CORRECTED	ERROR	EXPECT	DIFF
AC-228	LLD<7.24E-01		LLD<7.24E-01		911.07	
AG-108M	LLD<1.84E-01		LLD<1.84E-01		433.94	
AG-110M	LLD<8.41E-01		LLD<8.41E-01		657.76	
AM-241	LLD<7.59E-01		LLD<7.59E-01		59.54	
AM-243	LLD<2.01E-01		LLD<2.01E-01		74.67	
AR-41	LLD<1.15E-01		LLD<1.15E-01		1293.64	
AU-198	LLD<1.64E-01		LLD<1.64E-01		411.80	
BA-133	LLD<2.45E-01		LLD<2.45E-01		356.02	
BA-139	LLD<4.12E-01		LLD<4.12E-01		165.85	
BA-140	LLD<6.21E-01		LLD<6.21E-01		537.27	
BA-141	LLD<2.36E-01		LLD<2.36E-01		190.23	
BE-7	LLD<1.72E+00		LLD<1.72E+00		477.59	
BI-207	LLD<1.70E-01		LLD<1.70E-01		569.70	
BI-212	LLD<2.23E+00		LLD<2.23E+00		727.27	
BI-214	LLD<1.00E+00		LLD<1.00E+00		609.32	
CD-109	LLD<2.87E+00		LLD<2.87E+00		88.03	
CE-139	LLD<1.12E-01		LLD<1.12E-01		165.85	
CE-141	LLD<1.72E-01		LLD<1.72E-01		145.44	
CEPR144	LLD<1.43E+00		LLD<1.43E+00		133.51	
CO-56	LLD<1.73E-01		LLD<1.73E-01		846.76	
CO-57	LLD<9.28E-02		LLD<9.28E-02		122.06	
CO-58	LLD<1.69E-01		LLD<1.69E-01		810.75	
CO-60	2.05E+01	+6.38E-01	2.05E+01	+6.38E-01	1332.50	-0.00
					1173.24	-0.14
CR-51	LLD<1.27E+00		LLD<1.27E+00		320.09	
CS-134	1.28E+01	+5.38E-01	1.28E+01	+5.38E-01	795.84	-0.10
					604.70	-0.03
CS-136	LLD<1.71E-01		LLD<1.71E-01		818.51	
CS-137	2.81E+01	+6.78E-01	2.81E+01	+6.78E-01	661.65	-0.05
CS-138	LLD<9.04E-02		LLD<9.04E-02		1435.86	
EU-152	LLD<3.59E-01		LLD<3.59E-01		1408.01	
EU-154	LLD<2.89E-01		LLD<2.89E-01		1274.45	
EU-155	LLD<3.56E-01		LLD<3.56E-01		105.31	
FE-59	LLD<3.89E-01		LLD<3.89E-01		1099.25	
HF-181	LLD<1.81E-01		LLD<1.81E-01		482.20	
HG-203	LLD<1.50E-01		LLD<1.50E-01		279.20	
I-131	LLD<1.91E-01		LLD<1.91E-01		364.48	
I-132	LLD<2.26E-01		LLD<2.26E-01		667.69	
I-133	LLD<1.76E-01		LLD<1.76E-01		529.69	
I-134	LLD<1.83E-01		LLD<1.83E-01		847.03	
I-135	LLD<3.87E-01		LLD<3.87E-01		1260.41	
K-40	LLD<1.82E+00		LLD<1.82E+00		1460.75	
KR-85	LLD<3.74E+01		LLD<3.74E+01		513.99	
KR-85M	LLD<1.02E-01		LLD<1.02E-01		151.17	
KR-87	LLD<3.42E-01		LLD<3.42E-01		402.58	
KR-89	LLD<7.88E-01		LLD<7.88E-01		220.90	
LA-140	LLD<6.32E-02		LLD<6.32E-02		1596.20	

LA-142	LLD<3.12E-01	LLD<3.12E-01	641.83
MN-54	LLD<1.66E-01	LLD<1.66E-01	834.83
MN-56	LLD<1.74E-01	LLD<1.74E-01	846.76
NA-22	LLD<9.83E-02	LLD<9.83E-02	1274.55
NA-24	LLD<1.44E-01	LLD<1.44E-01	1368.60
NB-94	LLD<1.53E-01	LLD<1.53E-01	702.63
NB-95	LLD<1.62E-01	LLD<1.62E-01	765.78
NB-97	LLD<8.22E-01	LLD<8.22E-01	657.92
NP-238	LLD<7.78E-01	LLD<7.78E-01	984.45
NP-239	LLD<8.62E-01	LLD<8.62E-01	277.60
PA-233	LLD<3.87E-01	LLD<3.87E-01	311.98
PA-234M	LLD<3.57E+01	LLD<3.57E+01	1001.03
PB-210	LLD<4.39E+00	LLD<4.39E+00	465.03
PB-212	LLD<2.70E-01	LLD<2.70E-01	239.00
PB-214	LLD<4.18E-01	LLD<4.18E-01	351.92
PO-210	LLD<1.54E+04	LLD<1.54E+04	804.00
PO-214	LLD<6.40E+03	LLD<6.40E+03	799.70
PO-216	LLD<1.30E+04	LLD<1.30E+04	804.90
PU-239	LLD<1.24E+03	LLD<1.24E+03	129.30
PU-241	LLD<4.57E+04	LLD<4.57E+04	148.57
RA-224	LLD<2.96E+00	LLD<2.96E+00	240.99
RA-226	LLD<2.64E+00	LLD<2.64E+00	186.10
RB-88	LLD<3.44E-01	LLD<3.44E-01	1836.00
RB-89	LLD<3.82E-01	LLD<3.82E-01	1031.88
RN-220	LLD<1.44E+02	LLD<1.44E+02	549.73
RU-103	LLD<1.71E-01	LLD<1.71E-01	497.08
RURH106	LLD<3.00E+00	LLD<3.00E+00	621.80
SB-124	LLD<3.09E-01	LLD<3.09E-01	602.72
SB-125	LLD<1.38E+00	LLD<1.38E+00	176.33
SC-46	LLD<2.04E-01	LLD<2.04E-01	1120.45
SE-75	LLD<2.02E-01	LLD<2.02E-01	264.66
SN-113	LLD<2.33E-01	LLD<2.33E-01	391.67
SR-85	LLD<1.64E-01	LLD<1.64E-01	513.99
SR-91	LLD<2.80E-01	LLD<2.80E-01	555.60
SR-92	LLD<7.87E-02	LLD<7.87E-02	1383.94
TA-182	LLD<5.90E-01	LLD<5.90E-01	1121.30
TC-99M	LLD<9.22E-02	LLD<9.22E-02	140.51
TE-123M	LLD<1.03E-01	LLD<1.03E-01	159.00
TE-125M	LLD<2.66E+01	LLD<2.66E+01	109.27
TE-132	LLD<1.28E-01	LLD<1.28E-01	228.16
TH-228	LLD<9.26E+00	LLD<9.26E+00	84.37
TL-208	LLD<1.96E-01	LLD<1.96E-01	583.14
U-235	LLD<1.76E-01	LLD<1.76E-01	185.71
U-237	LLD<5.18E-01	LLD<5.18E-01	208.00
W-187	LLD<5.18E-01	LLD<5.18E-01	685.74
XE-131M	LLD<4.68E+00	LLD<4.68E+00	163.98
XE-133	LLD<3.20E-01	LLD<3.20E-01	81.00
XE-133M	LLD<1.15E+00	LLD<1.15E+00	233.21
XE-135	LLD<1.35E-01	LLD<1.35E-01	249.79
XE-138	LLD<3.99E-01	LLD<3.99E-01	258.41
Y-88	LLD<6.95E-02	LLD<6.95E-02	1836.06
Y-91	LLD<4.43E+01	LLD<4.43E+01	1204.90
Y-91M	LLD<1.61E-01	LLD<1.61E-01	555.60
ZN-65	LLD<4.48E-01	LLD<4.48E-01	1115.55
ZR-95	LLD<2.81E-01	LLD<2.81E-01	756.73
ZR-97	LLD<1.49E-01	LLD<1.49E-01	743.33

TOTAL      6.14E+01 +-1.07E+00      6.14E+01 +-1.07E+00

STANDARD DEVIATION = 0.05

EBAR = \*\*\*\*\* MEV/DISINTEGRATION  
MAXIMUM PERMISSABLE ACTIVITY = 1.46E-09 UC/LI  
TOTAL MEASURED ACTIVITY = 6.14E+01 (+-1.07E+00) UC/LI  
% TECH. SPEC. = \*\*\*\*\* (+-\*\*\*\*\*)

ERROR QUOTATION AT 1.96 SIGMA  
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1127.55	563.25	523.	12.7	2.06E+01
1139.64	569.29	890.	11.4	3.54E+01
1604.90	801.88	405.	14.2	2.14E+01
2730.89	1365.15	92.	25.4	7.57E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.37	1460.99	178.	15.9	1.55E+01

# Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	WA77344
PROCEDURE/REV	LA-925-106/A-2
TECHNOLOGIST	Sue Lai
DATE	June 22, 1990
TEMPERATURE	N/A
STARTING TIME	0800
ENDING TIME	1140
CHEMIST	S. A. Catlow

Uranium Analysis  
Fusion Dissolution

	DESCRIPTION	LAB ID
1	Initial LMCS Check Std.	F0469
2	Reagent Blank	F0484
3	Sample 89-070	F0470
4	Duplicate Sample 89-070	F0471
5	Spike of Sample 89-070	F0472
6	Final LMCS Check Std.	F0473
7		
8		
9		
10		
11		

	DESCRIPTION	LAB ID
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BK# & ALQT.VOL.	FINAL VOL. OF STD.
LMCS Check Standard	58B38/1 uL			5.7 mL
Spike	58B38/1 uL	F0470/1 uL		5.7 mL

## **WATER DIGESTION TEST ANALYSIS**

## Single Shell Tank Project

**Water Digestion**  
**Laboratory Results of Solids**  
**Units are Sample Wet Weight**

Tank 241-U-110

Core 12

Segment 4

Customer ID: 89-072

Laboratory Segment Serial No.: F0465

Laboratory ID:	Check Standard	Blank	Sample	Sample Duplicate	Spike of Sample	Check Standard
	N/A	F0486	F0475	F0476	F0477	N/A
Water Digestion	N/A	Complete	9.80	g/L 1.00E+01 g/L	1.02E+01 g/L	N/A
Laboratory ID:	F0426	F0438	F0475	F0476	F0429	F0574
<b>Ion Chromatograph</b>						
Fluoride	90.80%	<1.00E-01 ppm	1.91E+03 ug/g	1.42E+03 ug/g	85.60%	91.80%
Chloride	99.70%	2.02E-01 ppm	<1.03E+03 ug/g	1.65E+03 ug/g	102.40%	97.50%
Nitrate	101.90%	<1.00 ppm	6.10E+04 ug/g	4.70E+04 ug/g	108.40%	102.70%
Phosphate	100.80%	<1.00 ppm	<1.03E+04 ug/g	<1.01E+04 ug/g	105.60%	101.50%
Sulfate	100.80%	<1.00 ppm	4.16E+03 ug/g	3.56E+03 ug/g	110.30%	100.50%
Laboratory ID:	F0474	F0486	F0475	F0476	F0477	F0478
Total Organic Carbon	97.50%	2.60 ug	8.98E+02 ug/g	7.15E+02 ug/g	96.28%	96.70%

Single Shel Tank

**Water Digestion**  
**Sample Results on Laboratory Digestion**

Tank 241-U-110  
Core 12  
Segment 4  
Customer ID: 89-072

Laboratory Segment Serial No.: F0465

		Check Standard	Blank	Sample	Sample Duplicate	Spike of Sample	Check Standard
Laboratory ID:		N/A	F0486	F0475	F0476	F0477	N/A
Water Digestion		N/A	Complete	9.80 g/L	1.00E+01 g/L	1.02E+01 g/L	N/A
Laboratory ID:		F0426	F0438	F0475	F0476	F0429	F0574
<b>Ion Chromatograph</b>							
Fluoride	2nd Run	90.80%	<1.00E-01 ppm	1.87E+01 ppm	1.42E+01 ppm	85.60%	91.80%
Chloride	1st Run	99.70%	2.02E-01 ppm	<1.01E+01 ppm	1.65E+01 ppm	102.40%	97.50%
Nitrate	1st Run	101.90%	<1.00 ppm	5.98E+02 ppm	4.70E+02 ppm	108.40%	102.70%
Phosphate	1st Run	100.80%	<1.00 ppm	<1.01E+02 ppm	<1.01E+02 ppm	105.60%	101.50%
Sulfate	1st Run	100.80%	<1.00 ppm	4.08E+01 ppm	3.56E+01 ppm	110.30%	100.50%
Laboratory ID:		F0474	F0486	F0475	F0476	F0477	F0478
Total Organic Carbon		97.50%	2.60 ug	8.80E-03 g/L	7.15E-03 g/L	96.28%	96.70%

# Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	N/A
PROCEDURE/REV	LA-504-101/A-2
TECHNOLOGIST	S. Cervantes
DATE	March 07, 1990
TEMPERATURE	25 C
STARTING TIME	1300 03-06-90
ENDING TIME	1045 03-07-90
CHEMIST	H. S. Rich

## Water Digestion

Note: Sample is not spiked prior to digestion. This procedure provides a sample to be spiked later with the appropriate elements.

	DESCRIPTION	LAB ID
1	Reagent Blank	F0486
2	Sample 89-072	F0475
3	Duplicate Sample 89-072	F0476
4	Spike of Sample 89-072	F0477
5		
6		
7		
8		
9		
10		
11		

	DESCRIPTION	LAB ID
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY Book # & ALIQUOT VOL.	SECOND Book # & ALIQUOT VOL.	THIRD Bk# & ALQ.T.VOL.	FINAL VOL. OF STD.
N/A				
Spike (See Note)				

# Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	DIONEX 4000
PROCEDURE/Rev	LA-533-105/A-3
TECHNOLOGIST	N. E. Wright
DATE	April 06, 1990
TEMPERATURE	22 C
STARTING TIME	1100 04-05-90
ENDING TIME	1515 04-05-90
CHEMIST	H. S. Rich

Ion Chromatograph Analysis  
Water Digestion

	DESCRIPTION	LAB ID
1	Initial LMCS Check Std.	F0426
2	Reagent Blank	F0438
3	Sample 89-070	F0427
4	Duplicate Sample 89-070	F0428
5	Spike of Sample 89-070	F0429
6	Sample 89-071	F0451
7	Duplicate Sample 89-071	F0452
8	Sample 89-072	F0475
9	Duplicate Sample 89-072	F0476
10	Sample 89-075	F0547
11	Duplicate Sample 89-075	F0548

	DESCRIPTION	LAB ID
12	Sample 89-076	F0571
13	Duplicate Sample 89-076	F0572
14	Sample Core-007	F0983
15	Duplicate Sample Core-007	F0984
16	Duplicate Sample Core-006	F0064
17	Final LMCS Check Std	F0574
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY Book # & ALIQUOT VOL.	SECOND Book # & ALIQUOT VOL.	THIRD Bk# & ALQ.T.VOL.	FINAL VOL. OF STD.
LMCS Check Std.	6C11HO/100 uL			10.1 mL
Spike	35C9-77/300 uL	F0427/50 uL		5.3 mL

# Single Shell Tank Calibration Record

ANALYTE: Ion Chromatograph

PROCEDURE: LA-533-105

REVISION: A-3

INSTRUMENT: DIONEX 4000

PROPERTY NUMBER: WB24721

TECHNOLOGIST: Nora Wright

PAYROLL NUMBER: 6B107

DATE: April 03, 1990

CALIBRATION STANDARD ID: 35C9-77 issued April 02, 1990

ANALYTE CONCENTRATION: F 60.0 Cl 76.0 NO<sub>3</sub> 611.0 PO<sub>4</sub> 606.0 SO<sub>4</sub> 589.0

TYPE OF CALIBRATION: Linear

COMMENTS:

## DIONEX METHOD PARAMETERS - SST.MET

## Detector Parameters

Number of Detectors.....	1
Detector 1 Type.....	CDM

## Report Options

Run Time (minutes).....	11.50
Detector 1 real time plot scale.....	20.00
Print Report.....	Yes
Print Replot.....	Yes
AutoScale Replot to Highest Peak.....	Yes
Print Retention Times on Chromatogram.....	Yes
List Peaks Not Found in this run.....	No
Report Unknowns found in run.....	Yes
Record Raw Data.....	Yes
Raw Data File Name: A:\90040300.D05	
Record Result Data.....	No

## Integration Parameters

Sampling Rate (seconds).....	0.20
Peak Threshold (mV or uS/data pt interval).....	0.400
Starting Peak Width (seconds).....	10.0
Peak Area Reject.....	1000

## Integration Timed Events

Time	Description
-----	-----

## Calibration Parameters

External or Internal Calibration.....	External
Calibrate by Area or Height.....	Height
Replace Or Average Calibrations.....	Replace
Number Of Levels for Calibration.....	6
Calibration fit type.....	Quadratic
Response Factor for unknown peaks.....	0.0
Default Injection Volume.....	1.0
Default Dilution Factor.....	1.0
Area Reject for Reference Peaks.....	1000
Percent Retention Time Window for Reference Peaks.....	5.0

Component # 1 FLUORIDE Retention Time 1.02  
 Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size  
 Least Squares Slope = 4.11817E-004  
 Least Squares Intercept = -6.11181E-002  
 Ka = -3.36922E-010

Level	Amount	Area	Height
1	1.19800E-001	1733	320
2	2.98500E-001	4705	821
3	5.94100E-001	9348	1644
4	1.17650E+000	21998	3547
5	2.30800E+000	37180	5315
6	4.44440E+000	74116	11092

Component # 2 CHLORIDE Retention Time 1.62  
 Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size  
 Least Squares Slope = 7.20825E-004  
 Least Squares Intercept = -7.89437E-002  
 Ka = -1.05413E-008

Level	Amount	Area	Height
1	1.51700E-001	1456	241
2	3.78110E-001	4024	594
3	7.52480E-001	8080	1191
4	1.49020E+000	17215	2702
5	2.92300E+000	28370	4066
6	5.62950E+000	59291	9183

Component # 3 NITRITE Retention Time 1.95  
 Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size  
 Least Squares Slope = 6.03697E-004  
 Least Squares Intercept = 4.43064E-001  
 Ka = 3.82504E-009

Level	Amount	Area	Height
1	1.06990E+000	9937	1360
2	2.66670E+000	25698	3515
3	5.30700E+000	53506	7323
4	1.05099E+001	114215	15244
5	2.06146E+001	218918	28443
6	3.97026E+001	440177	49476

Component # 4 BROMIDE Retention Time 3.00  
 Reference Peak FLUORIDE Window Size 5.00%  
 Least Squares Slope = 1.66948E-003  
 Least Squares Intercept = 2.80223E-001  
 Ka = -5.76698E-010

Level	Amount	Area	Height
1	1.00100E+000	0	495
2	2.49500E+000	0	1341
3	4.96500E+000	0	2740
4	9.86850E+000	0	5689
5	1.92877E+001	0	11502
6	3.71471E+001	0	22240

Component # 5      NITRATE      Retention Time    3.70  
 Reference Peak      C:\WINDOWS\AI400\METHOD\SST.MET      Window Size  
 Least Squares Slope    = 2.26506E-003  
 Least Squares Intercept = -5.58779E-001  
 Ka =                    2.11324E-008

Level	Amount	Area	Height
1	1.21960E+000	7363	607
2	3.03970E+000	19564	1518
3	6.04950E+000	39111	2906
4	1.19805E+001	83794	5858
5	2.34991E+001	132213	9250
6	4.52580E+001	274103	17468

Component # 6      PHOSPHATE      Retention Time    6.03  
 Reference Peak      C:\WINDOWS\AI400\METHOD\SST.MET      Window Size  
 Least Squares Slope    = 6.51026E-003  
 Least Squares Intercept = -2.98628E-001  
 Ka =                    -1.07878E-007

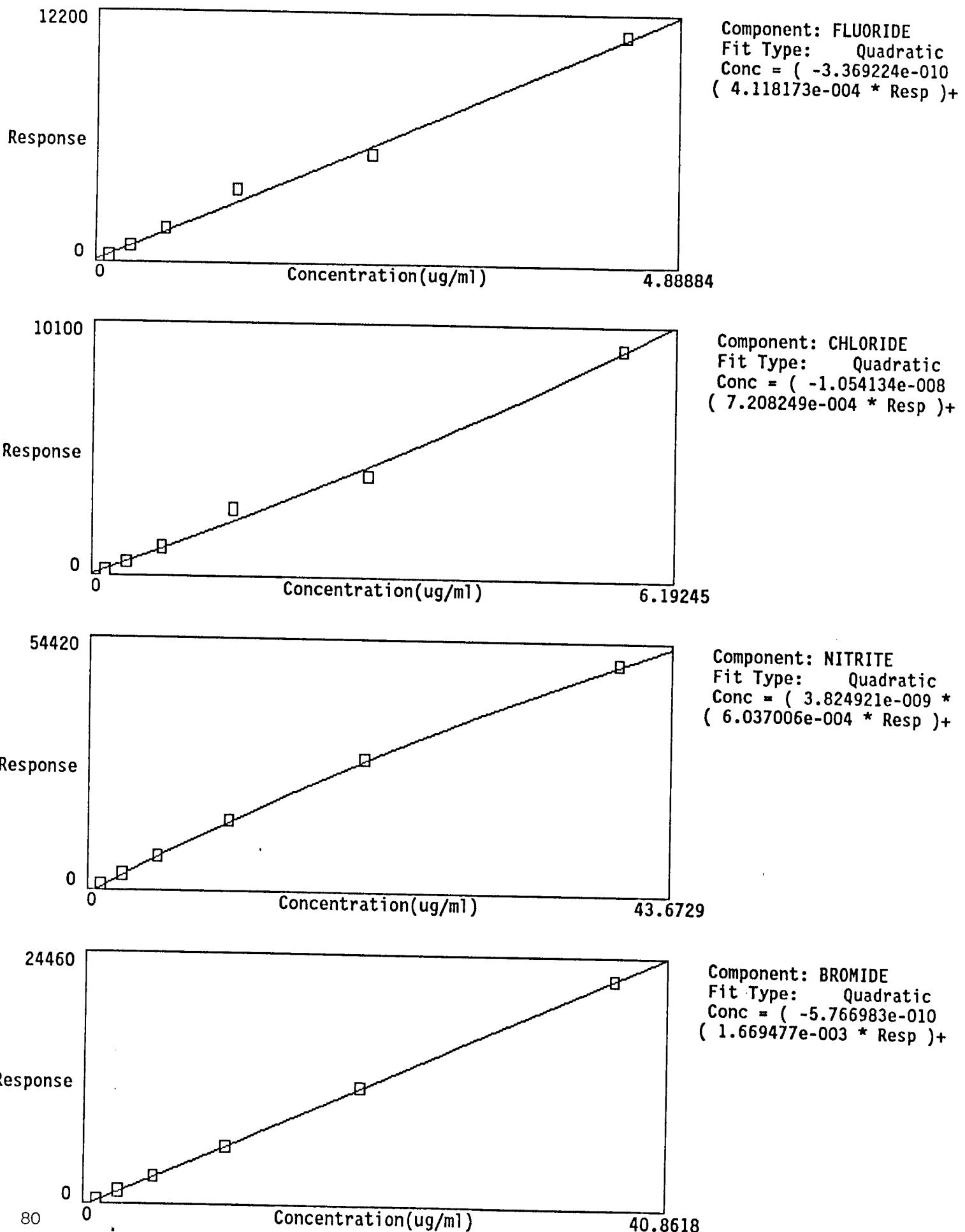
Level	Amount	Area	Height
1	1.20960E+000	3420	198
2	3.01490E+000	9585	519
3	6.00000E+000	19755	1057
4	1.18824E+001	32539	1886
5	2.33068E+001	69406	3876
6	4.48876E+001	142872	8003

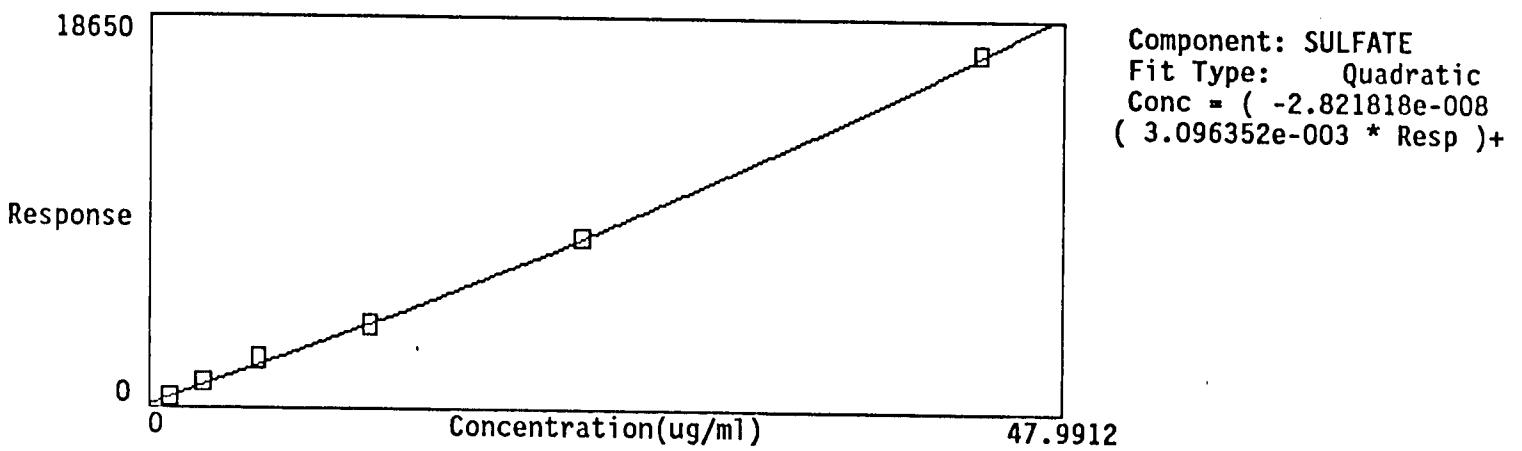
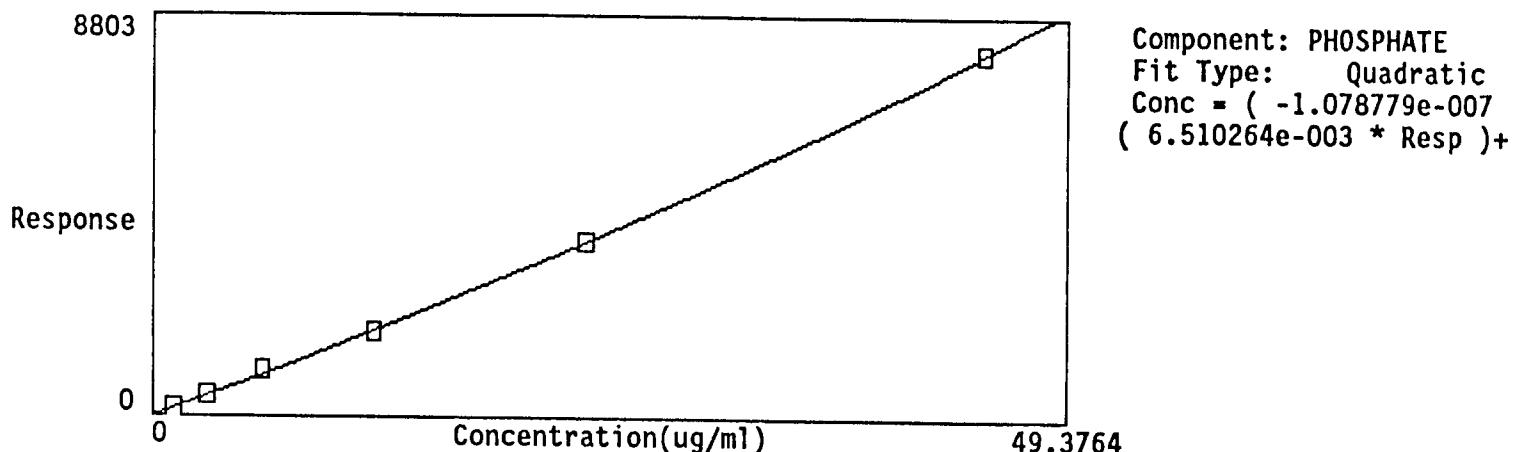
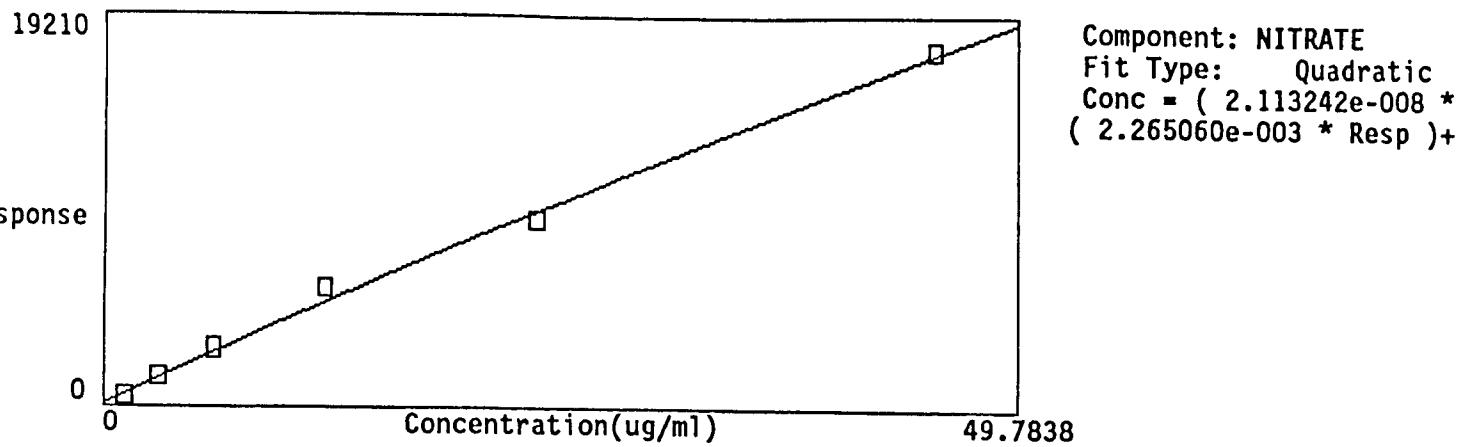
Component # 7      SULFATE      Retention Time    7.48  
 Reference Peak      C:\WINDOWS\AI400\METHOD\SST.MET      Window Size  
 Least Squares Slope    = 3.09635E-003  
 Least Squares Intercept = -7.42866E-001  
 Ka =                    -2.82182E-008

Level	Amount	Area	Height
1	1.17560E+000	10745	515
2	2.93030E+000	26326	1236
3	5.83170E+000	50588	2357
4	1.15491E+001	79004	4005
5	2.26530E+001	163581	8158
6	4.36284E+001	343157	16953

Component # 8      Oxalate      Retention Time    9.77  
 Reference Peak      FLUORIDE      Window Size      10.00%  
 Least Squares Slope    = 0.00000E+000  
 Least Squares Intercept = 0.00000E+000  
 Ka =                    0.00000E+000

Level	Amount	Area	Height
1	0.00000E+000	0	0
2	0.00000E+000	0	0
3	0.00000E+000	0	0
4	0.00000E+000	0	0
5	0.00000E+000	0	0
6	0.00000E+000	98993	5848





DATA REPROCESSED ON Mon Jul 02 13:05:05 1990

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Sample Name: AUTOCAL1R

Date: Tue Apr 03 10:17:01 1990

Data File : A:\90040300.D03

Method : C:\WINDOWS\AI400\METHOD\SST.MET

CIM Address: 1 System : 1 Cycle #: 3 Detector: CDM

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes

Number of Data Points = 3451

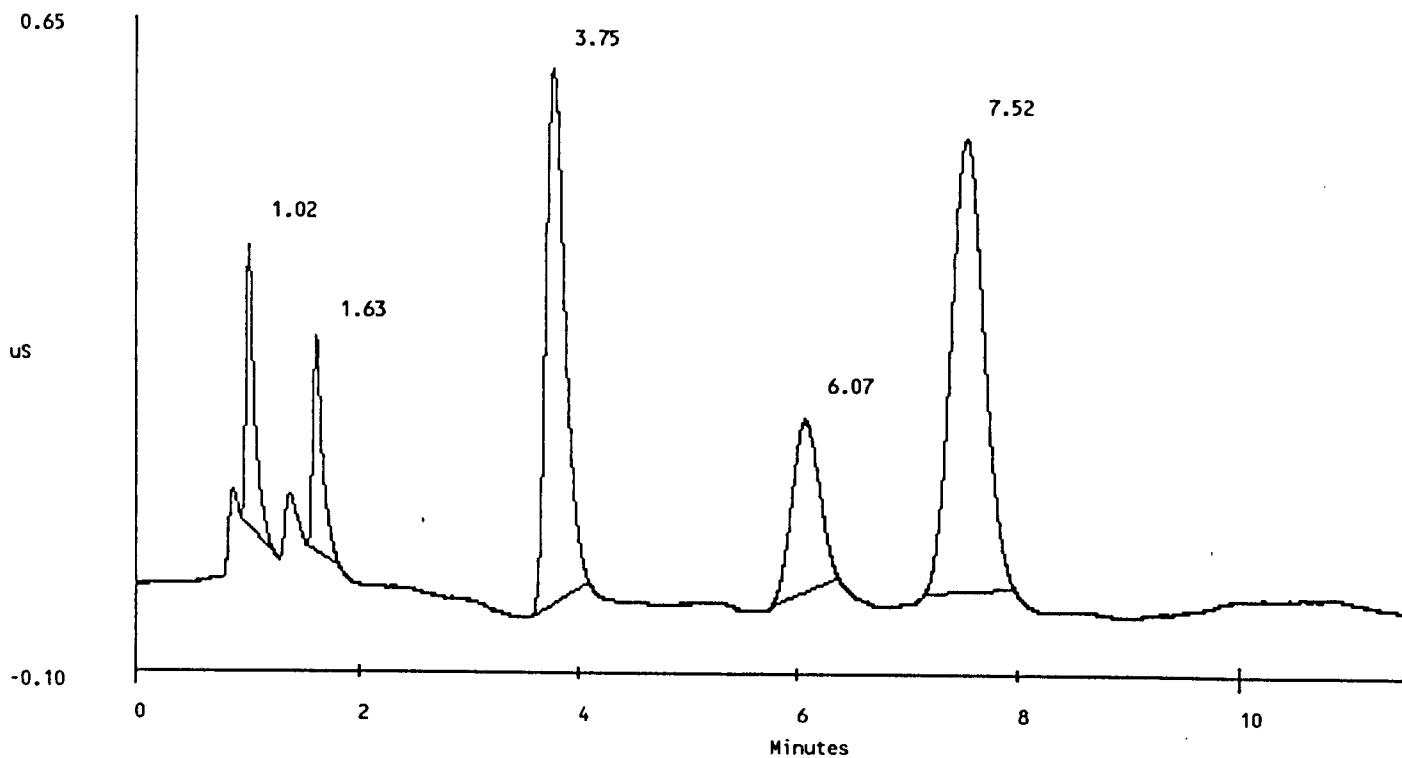
Area reject = 1000

One Data Point per 0.2 seconds

Amount Injected = 1

Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF HEIGHT	BL PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	1.198e-001	1.733e+003	320	1	0 0.00%
2	1.63	CHLORIDE	1.517e-001	1.456e+003	241	1	0 0.00%
3	3.75	NITRATE	1.220e+000	7.363e+003	607	1	0 0.00%
4	6.07	PHOSPHATE	1.210e+000	3.420e+003	198	1	0 0.00%
5	7.52	SULFATE	1.176e+000	1.075e+004	515	1	0 0.00%



DATA REPROCESSED ON Mon Jul 02 14:37:19 1990

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Sample Name: AUTOCAL2R	Date: Tue Apr 03 10:29:21 1990
Data File : A:\90040300.D04	
Method : C:\WINDOWS\AI400\METHOD\SST.MET	
CIM Address: 1	System : 1      Cycle #: 4      Detector: CDM

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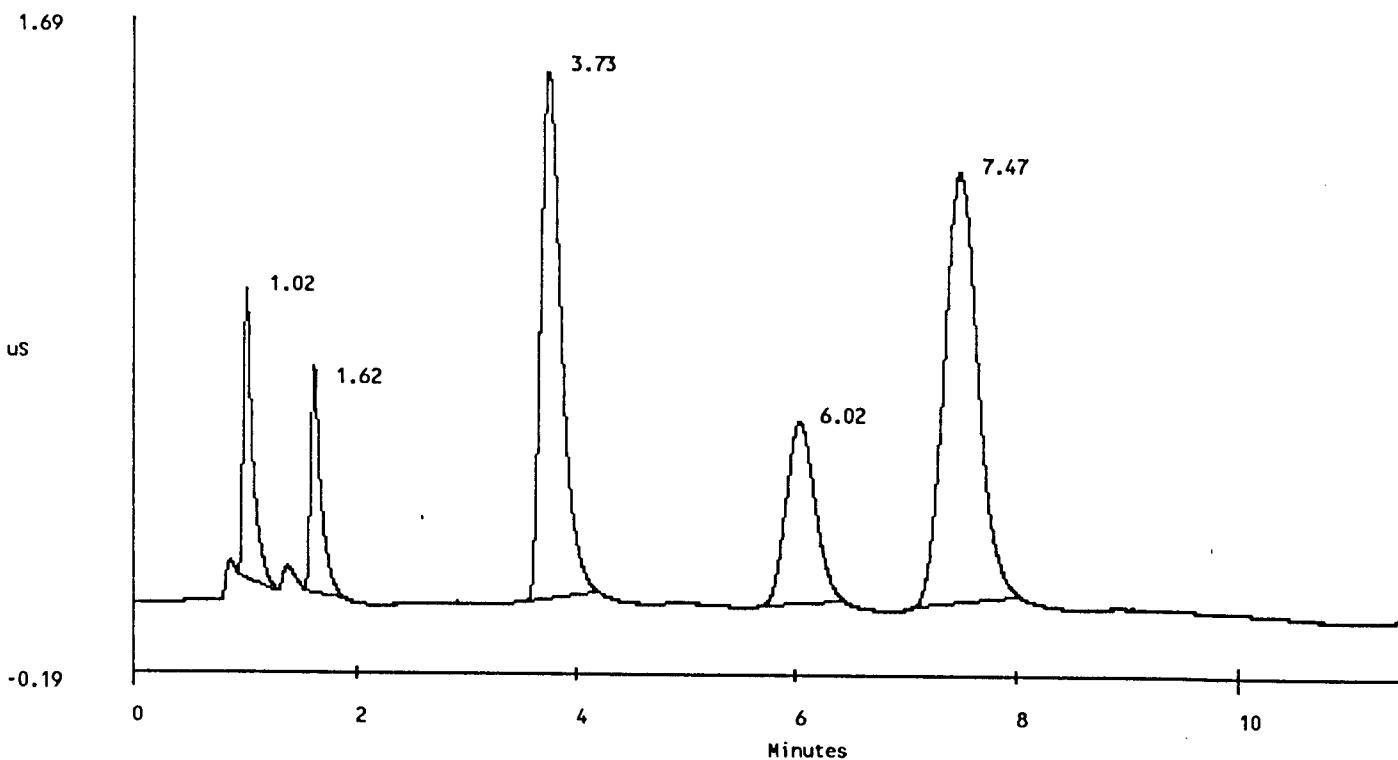
\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes                  Number of Data Points = 3451

Area reject = 1000                  One Data Point per 0.2 seconds

Amount Injected = 1                  Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	REF BL	% DELTA PEAK	RET TIME
1	1.02	FLUORIDE	2.984e-001	4.705e+003	821	1	0	0.00%
2	1.62	CHLORIDE	3.783e-001	4.024e+003	594	1	0	-1.02%
3	3.73	NITRATE	3.039e+000	1.956e+004	1518	1	0	-0.44%
4	6.02	PHOSPHATE	5.755e+000	9.585e+003	519	1	0	-0.82%
5	7.47	SULFATE	6.145e+000	2.633e+004	1236	1	0	-0.67%



DATA REPROCESSED ON Mon Jul 02 14:37:59 1990

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Sample Name: AUTOCAL3R	Date: Tue Apr 03 10:41:41 1990
Data File : A:\90040300.D05	
Method : C:\WINDOWS\AI400\METHOD\SST.MET	
CIM Address: 1	System : 1 Cycle#: 5 Detector: CDM

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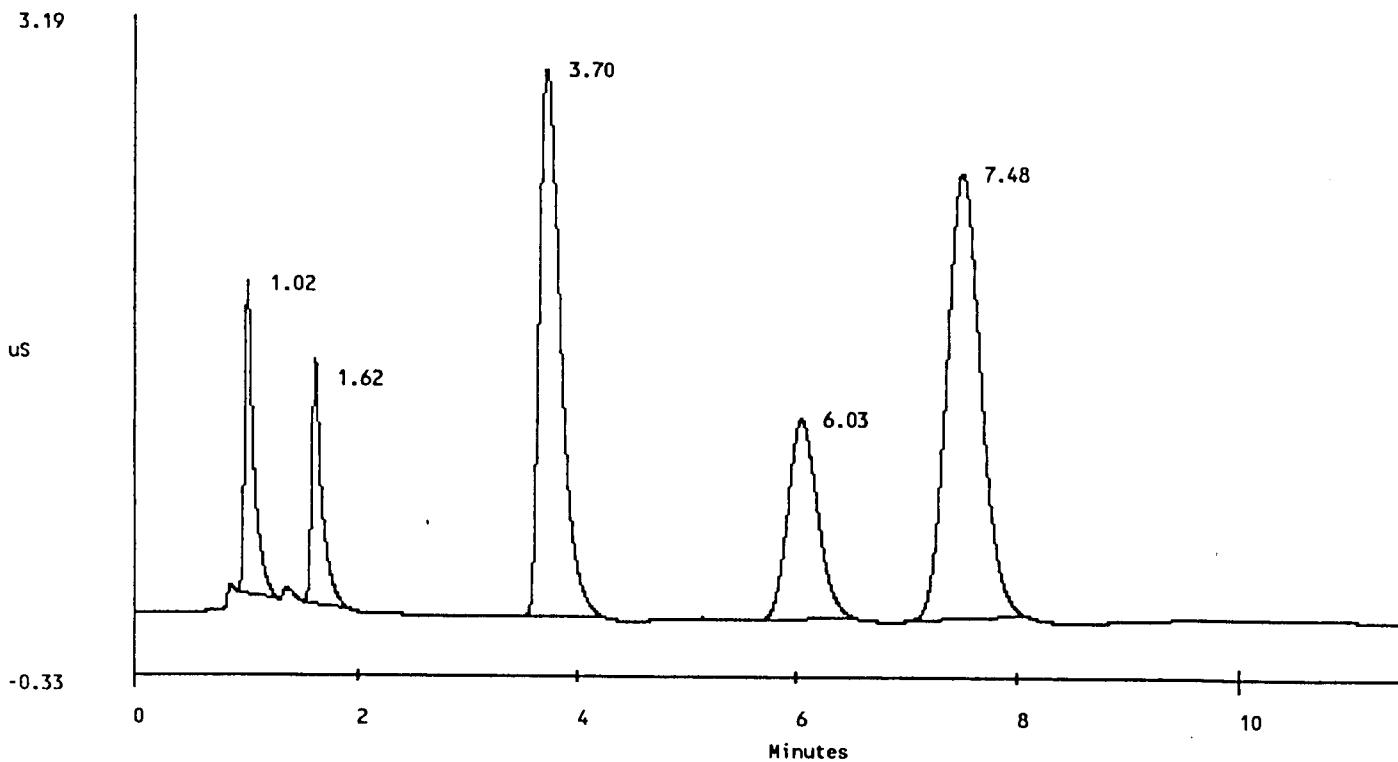
\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes Number of Data Points = 3451

Area reject = 1000 One Data Point per 0.2 seconds

Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF HEIGHT	BL PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	5.941e-001	9.348e+003	1644	1	0 0.00%
2	1.62	CHLORIDE	7.523e-001	8.080e+003	1191	1	0 -1.02%
3	3.70	NITRATE	6.051e+000	3.911e+004	2906	1	0 -1.33%
4	6.03	PHOSPHATE	8.564e+000	1.976e+004	1057	1	0 -0.55%
5	7.48	SULFATE	8.817e+000	5.059e+004	2357	1	0 -0.44%



DATA REPROCESSED ON Mon Jul 02 14:38:33 1990

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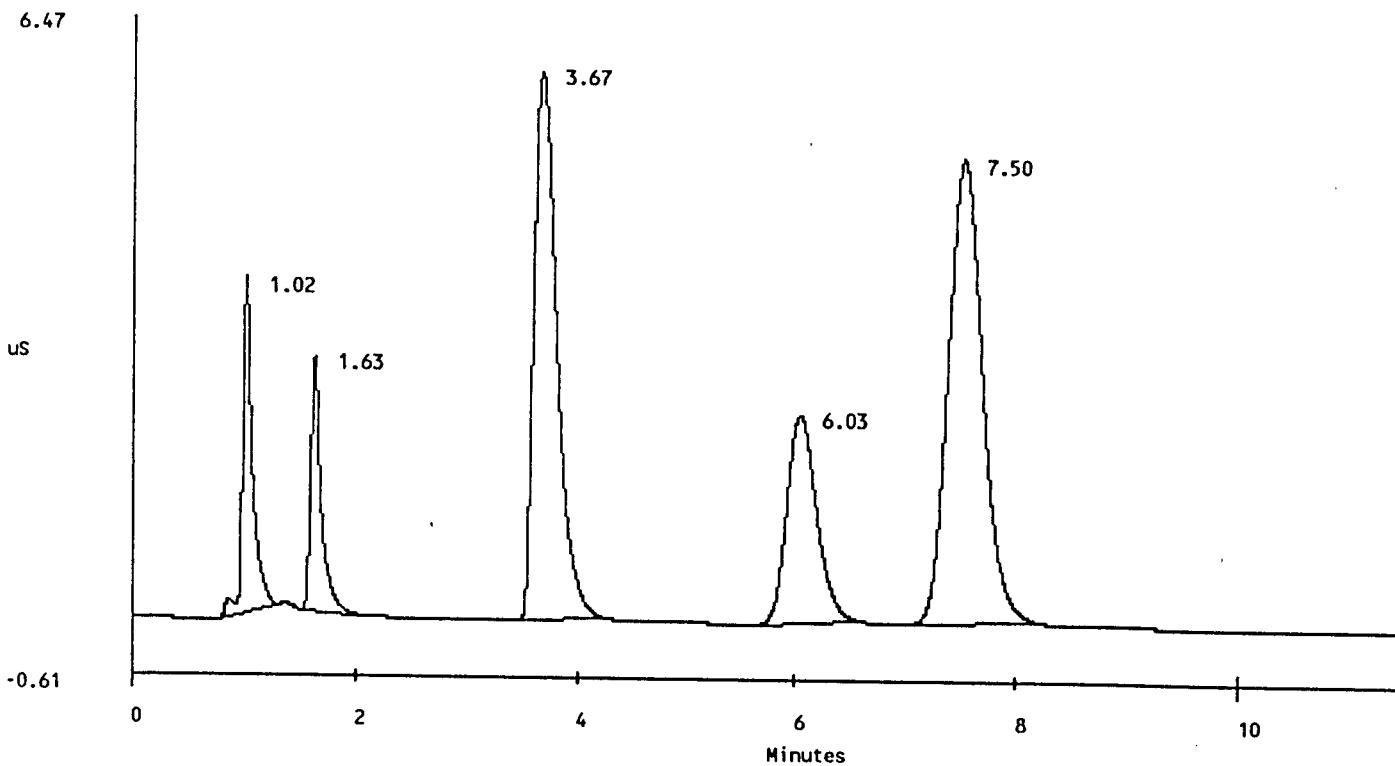
Sample Name: AUTOCAL4R	Date: Tue Apr 03 10:54:02 1990
Data File : A:\90040300.D06	
Method : C:\WINDOWS\AI400\METHOD\SST.MET	
CIM Address: 1	System : 1      Cycle #: 6      Detector: CDM

=====

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes                  Number of Data Points = 3450  
Area reject = 1000                  One Data Point per 0.2 seconds  
Amount Injected = 1                  Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF HEIGHT	BL PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	1.177e+000	2.200e+004	3547	1	0    0.00%
2	1.63	CHLORIDE	1.490e+000	1.722e+004	2702	1	0    0.00%
3	3.67	NITRATE	1.198e+001	8.379e+004	5858	1	0    -2.22%
4	6.03	PHOSPHATE	1.460e+001	4.206e+004	2212	1	0    -0.55%
5	7.50	SULFATE	1.496e+001	1.068e+005	4931	1	0    -0.22%



DATA REPROCESSED ON Mon Jul 02 14:39:07 1990

=====

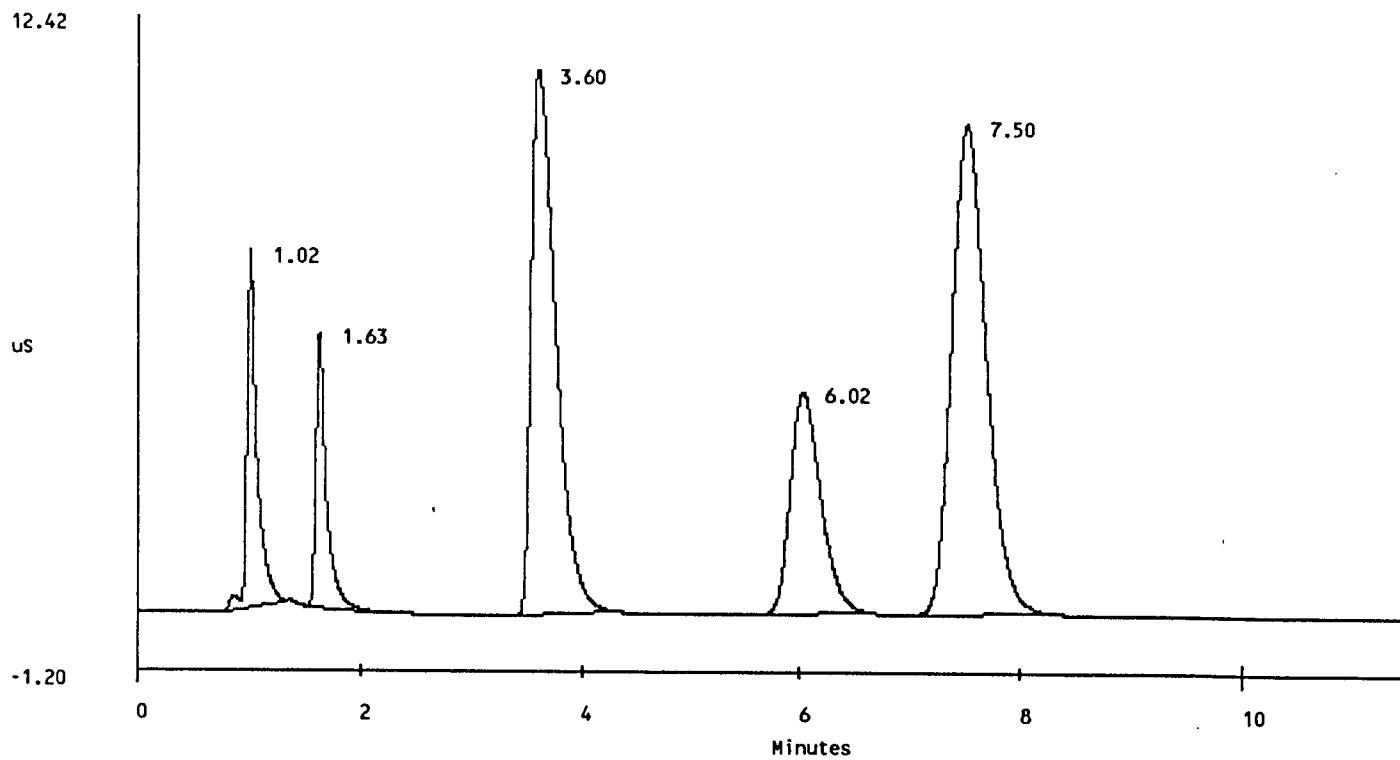
Sample Name: AUTOCAL5R	Date: Tue Apr 03 11:06:22 1990
Data File : A:\90040300.D07	
Method : C:\WINDOWS\AI400\METHOD\SST.MET	
CIM Address: 1	System : 1 Cycle#: 7 Detector: CDM

=====

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes Number of Data Points = 3450  
Area reject = 1000 One Data Point per 0.2 seconds  
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	REF BL	% DELTA PEAK	RET TIME
1	1.02	FLUORIDE	3.050e+000	4.520e+004	7323	1	0	0.00%
2	1.63	CHLORIDE	3.751e+000	3.558e+004	5631	1	0	0.00%
3	3.60	NITRATE	2.869e+001	1.757e+005	11209	1	0	-4.00%
4	6.02	PHOSPHATE	2.675e+001	8.811e+004	4535	1	0	-0.82%
5	7.50	SULFATE	2.728e+001	2.192e+005	10100	1	0	-0.22%



DATA REPROCESSED ON Mon Jul 02 14:39:42 1990

=====

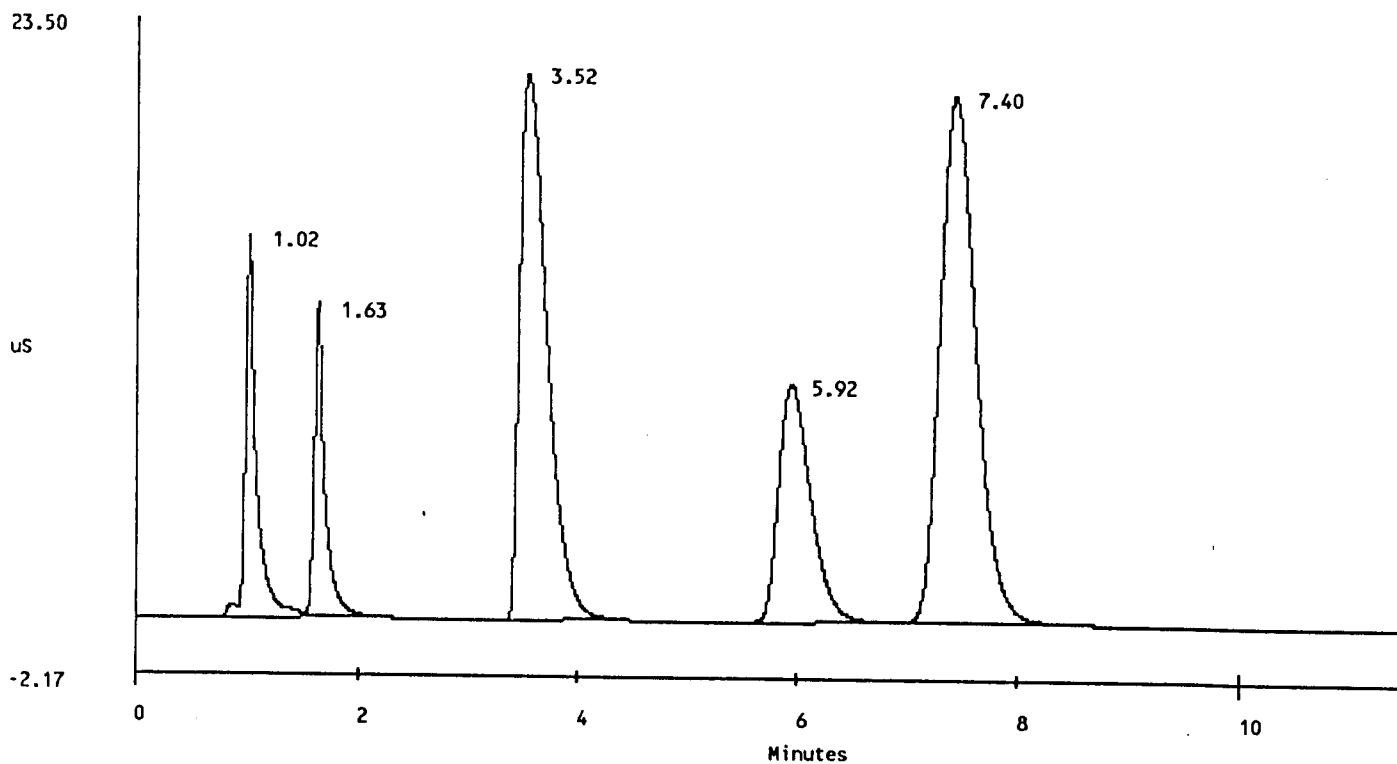
Sample Name: AUTOCAL6R	Date: Tue Apr 03 11:18:42 1990
Data File : A:\90040300.D08	
Method : C:\WINDOWS\AI400\METHOD\SST.MET	
CIM Address: 1 System : 1 Cycle#: 8	Detector: CDM

=====

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes Number of Data Points = 3451  
Area reject = 1000 One Data Point per 0.2 seconds  
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	REF BL	% DELTA PEAK	RET TIME
1	1.02	FLUORIDE	5.778e+000	9.886e+004	14697	2	0	0.00%
2	1.63	CHLORIDE	7.060e+000	7.699e+004	11887	2	0	0.00%
3	3.52	NITRATE	5.544e+001	3.641e+005	21314	1	0	-6.22%
4	5.92	PHOSPHATE	5.042e+001	1.851e+005	9060	1	0	-2.47%
5	7.40	SULFATE	5.218e+001	4.591e+005	20537	1	0	-1.55%



## DIONEX SCHEDULE - A:\90040500.SCH

Inject	Sample Name	Method Name	Data File	Volume	Dilution	Int Std
1	SETUP	c:\windows\ai	c:\windows\ai	1	1	0
2	BLANK	c:\windows\ai	c:\windows\ai	1	1	0
3	LMCS/6C11-HO	c:\windows\ai	c:\windows\ai	1	101	0
4	438B	c:\windows\ai	c:\windows\ai	1	1	0
5	427	c:\windows\ai	c:\windows\ai	1	101	0
6	428D	c:\windows\ai	c:\windows\ai	1	101	0
7	429S	c:\windows\ai	c:\windows\ai	1	101	0
8	451	c:\windows\ai	c:\windows\ai	1	101	0
9	452D	c:\windows\ai	c:\windows\ai	1	101	0
10	475	c:\windows\ai	c:\windows\ai	1	101	0
11	476D	c:\windows\ai	c:\windows\ai	1	101	0
12	547	c:\windows\ai	c:\windows\ai	1	101	0
13	548D	c:\windows\ai	c:\windows\ai	1	101	0
14	571	c:\windows\ai	c:\windows\ai	1	101	0
15	572D	c:\windows\ai	c:\windows\ai	1	101	0
16	983	c:\windows\ai	c:\windows\ai	1	51	0
17	984D	c:\windows\ai	c:\windows\ai	1	51	0
18	64D	c:\windows\ai	c:\windows\ai	1	101	0
19	LMCS/6C11-HO	c:\windows\ai	c:\windows\ai	1	101	0

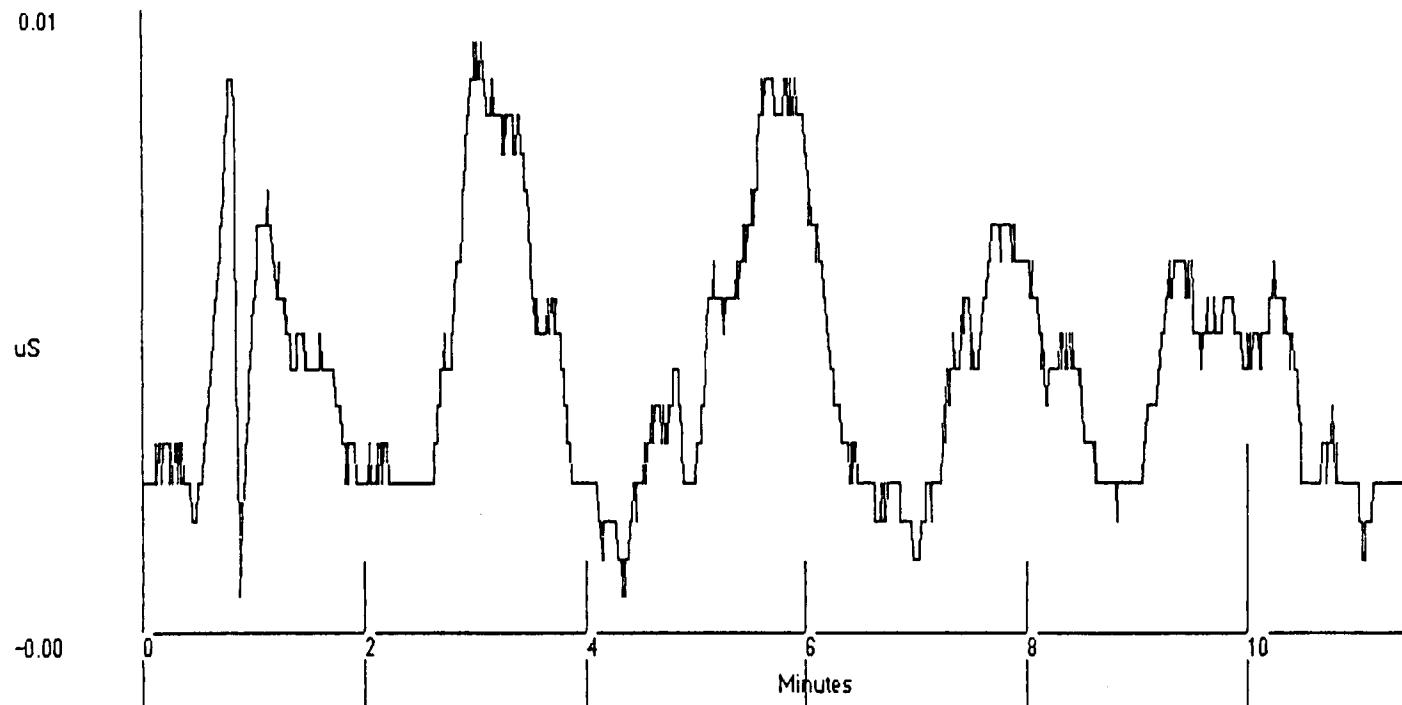
```
: Sample Name: SETUP                               Date: Thu Apr 05 11:44:48 1990:  
: Data File : c:\windows\ai400\data\900-5963.d01  
: Method    : c:\windows\ai400\method\sst.met  
: CIM Address: 1      System : 1      Cycle#: 1      Detector: CDM
```

```
***** EXTERNAL STANDARD REPORT *****
```

Start Time = 0.00 minutes Stop time = 11.50 Minutes  
Number of Data Points = 3450 One Data Point per 0.2 seconds  
Areareject = 1000  
Amount Injected = 1 Dilution factor = 1

PEAK	RET	PEAK	CONC. in	REF	% DELTA
NUM	TIME	NAME	ug/ml	AREA	HEIGHT BL PEAK RET TIME

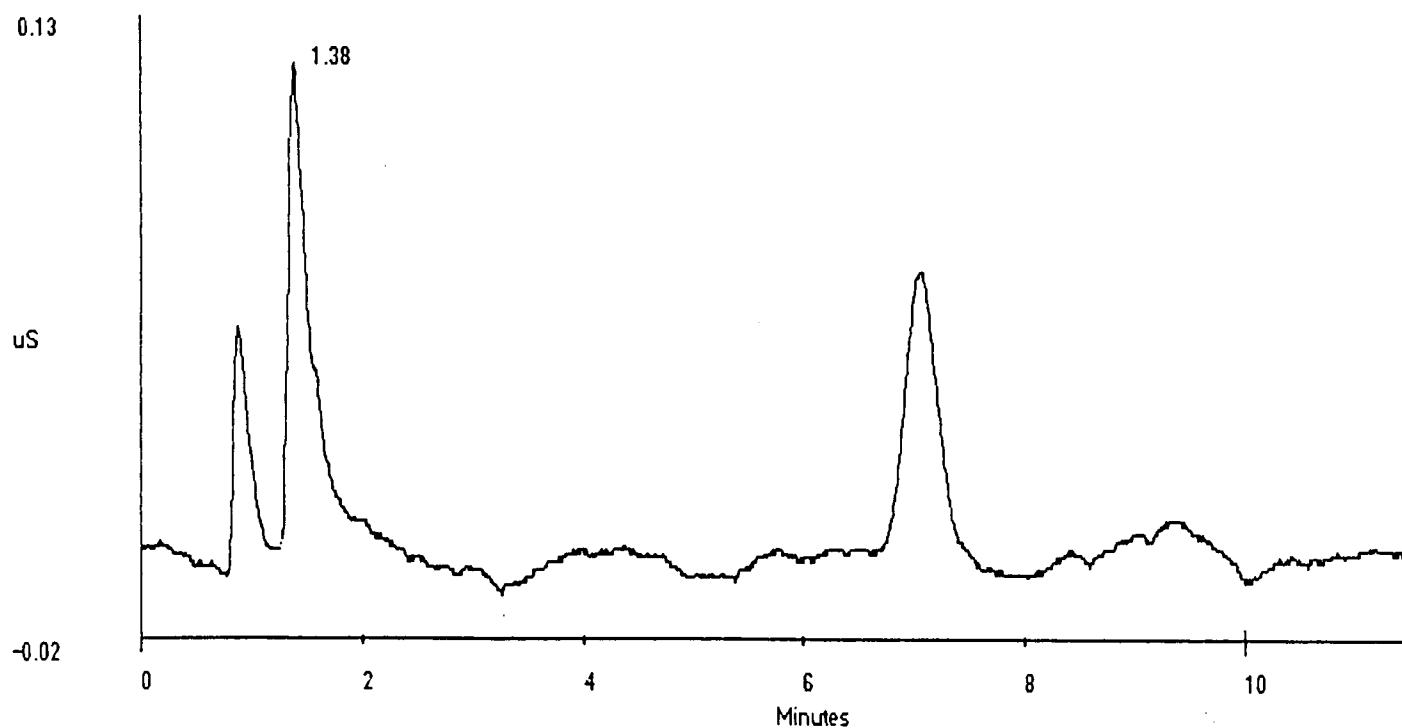
---



```
=====
: Sample Name: BLANK Date: Thu Apr 05 11:57:04 1990
: Data File : c:\windows\ai400\data\900-5963.d02
: Method : c:\windows\ai400\method\sst.met
: CIM Address: 1 System : 1 Cycle#: 2 Detector: CDM
=====
***** EXTERNAL STANDARD REPORT ****
```

```
Start Time = 0.00 minutes Stop time = 11.50 Minutes
Number of Data Points = 3450 One Data Point per 0.2 seconds
Areareject = 1000
Amount Injected = 1 Dilution factor = 1
```

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF	% DELTA	BL	PEAK	RET TIME
1	1.38		0.000e+000	1.021e+003	106				



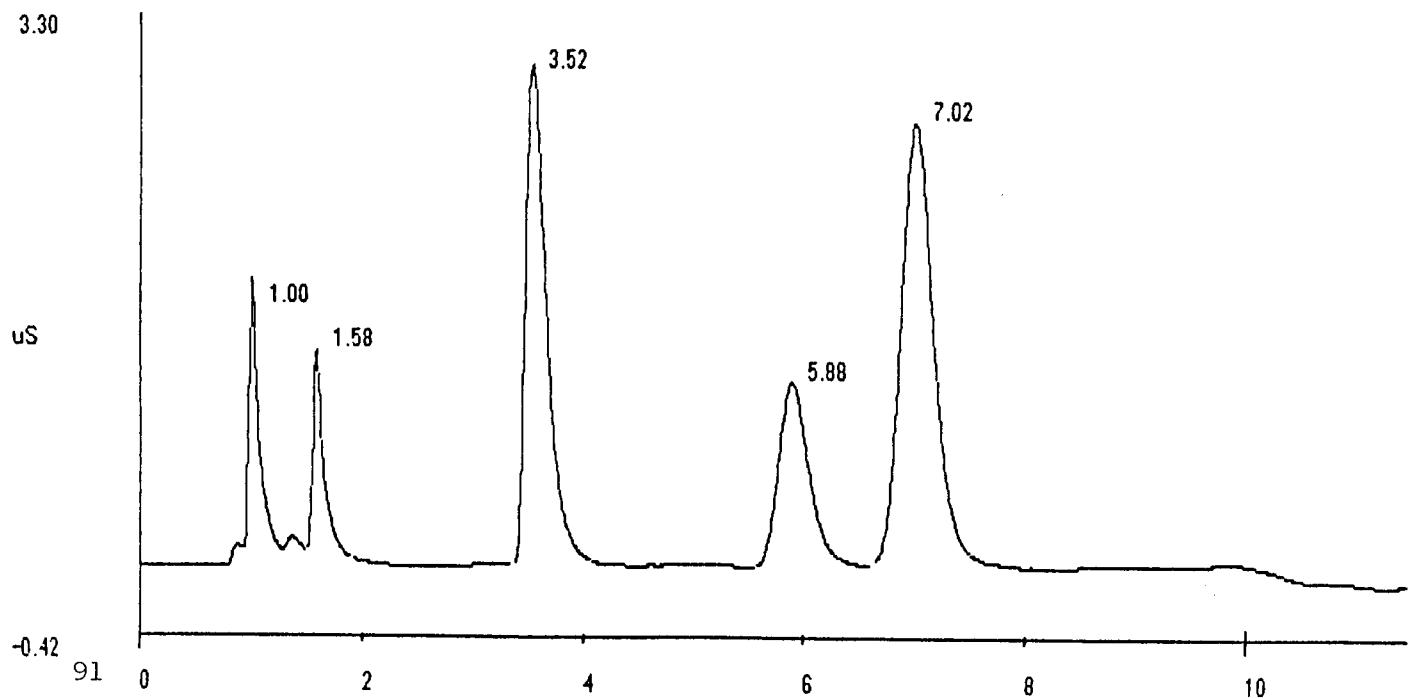
```

=====
: Sample Name: LMCS/6C11-HO          Date: Thu Apr 05 12:09:18 1990:
: Data File  : c:\windows\ai400\data\900-5963.d03
: Method     : c:\windows\ai400\method\sst.met
: CIM Address: 1      System : 1      Cycle#:  3      Detector: CDM
=====
***** EXTERNAL STANDARD REPORT *****

```

Start Time = 0.00 minutes Stop time = 11.50 Minutes  
 Number of Data Points = 3450 One Data Point per 0.2 seconds  
 Areareject = 1000  
 Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF	% DELTA
							PEAK	
1	1.00	FLUORIDE	5.097e+001	9.542e+003	1452	1	0	-1.64%
2	1.58	CHLORIDE	7.181e+001	7.920e+003	1209	1	0	-3.06%
3	3.52	NITRATE	6.106e+002	3.939e+004	2949	1	0	0.00%
4	5.88	PHOSPHATE	6.038e+002	2.002e+004	1084	1	0	-0.56%
5	7.02	SULFATE	6.268e+002	5.312e+004	2626	1	0	-5.18%

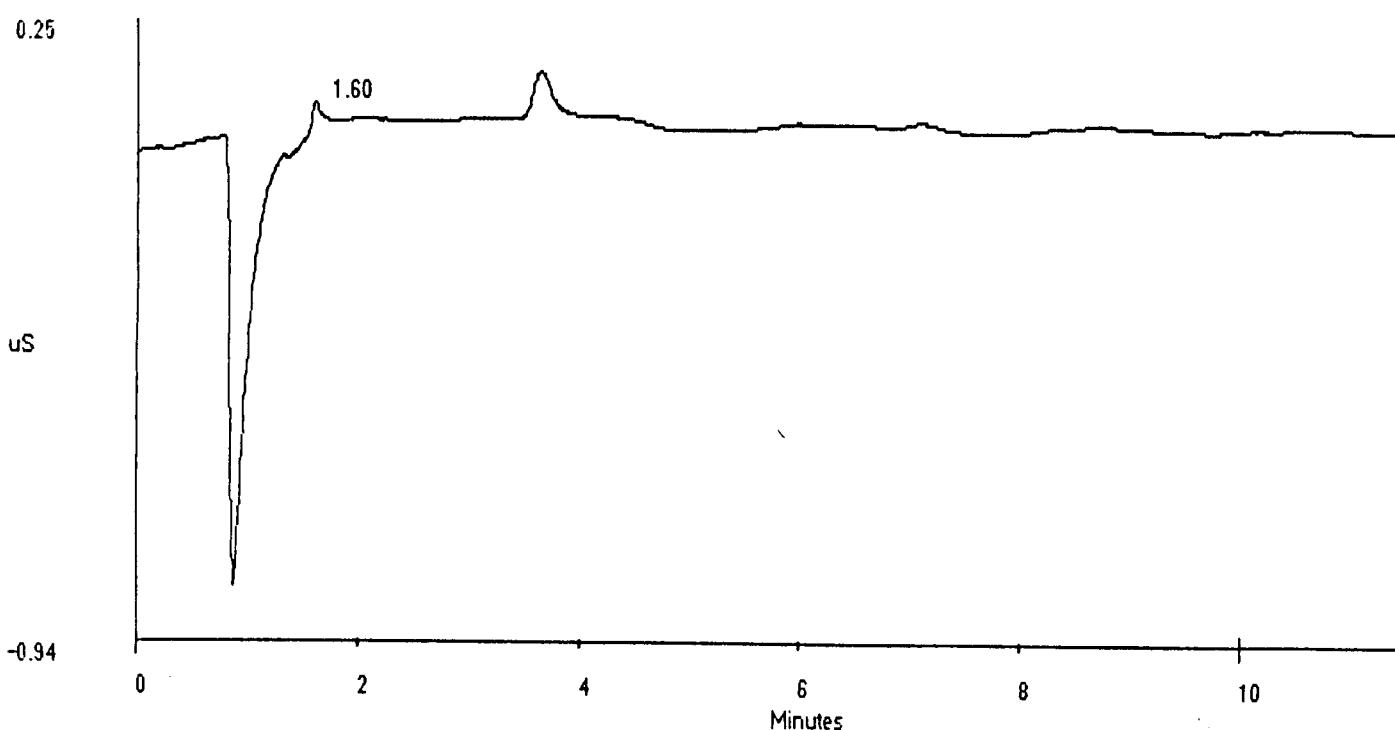


```
=====
| Sample Name: 438B           Date: Thu Apr 05 12:21:34 1990|
| Data File  : c:\windows\ai400\data\900-5963.d04          |
| Method     : c:\windows\ai400\method\sst.met            |
| CIM Address: 1      System : 1      Cycle#: 4      Detector: CDM|
=====
```

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Start Time = 0.00 minutes Stop time = 11.50 Minutes  
Number of Data Points = 3450 One Data Point per 0.2 seconds  
Areareject = 1000  
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF HEIGHT	% DELTA BL PEAK RET TIME
1	1.60	CHLORIDE	2.017e-001	1.746e+004	266	1 0 -2.04%



DATA REPROCESSED ON Thu Aug 23 13:22:47 1990

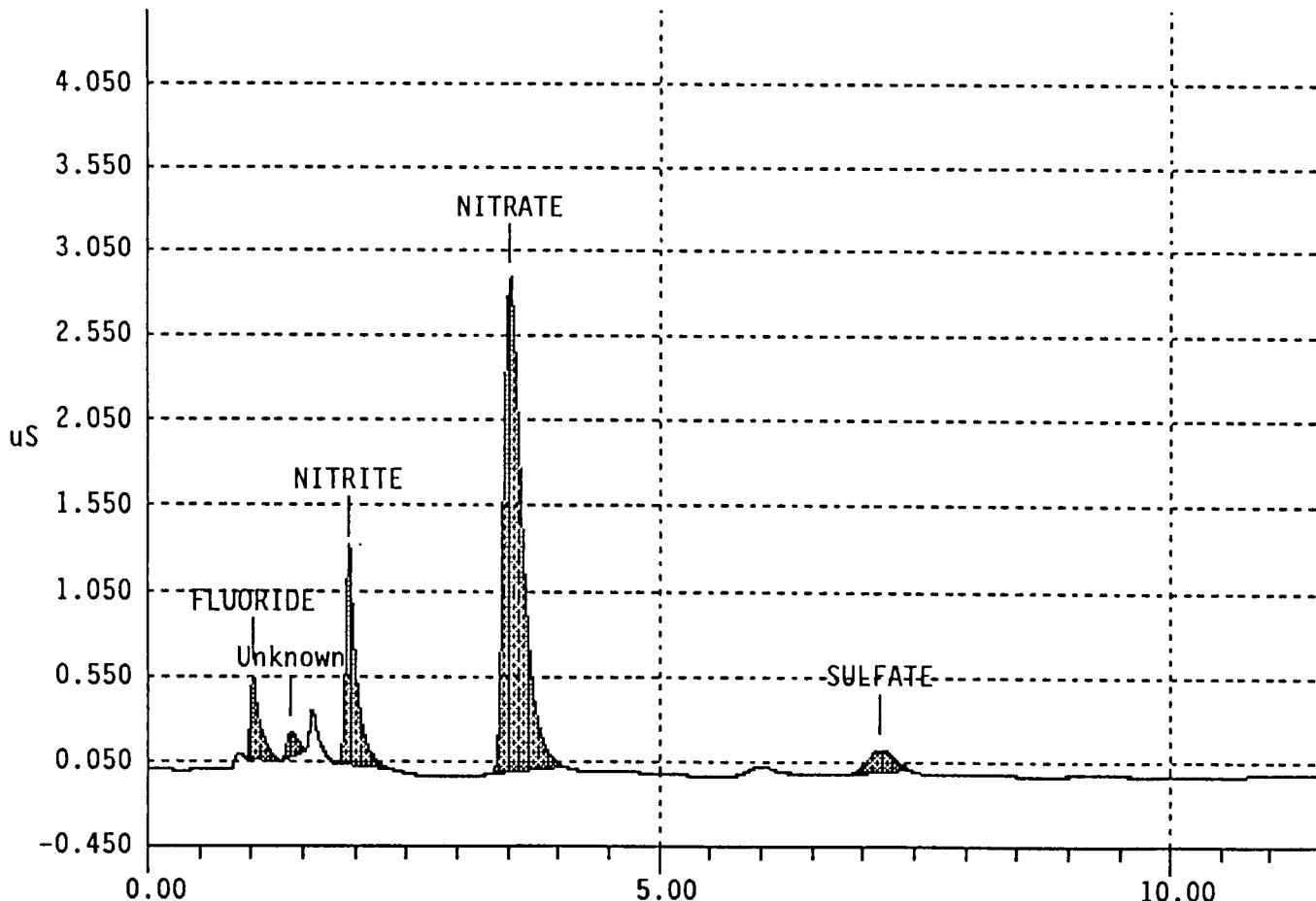
=====  
Sample Name: 475 Date: Thu Apr 05 14:35:06 1990  
Data File : A:\90040500.D10  
Method : c:\windows\ai400\method\sst.met  
ACI Address: 1 System : 1 Inject#: 10 Detector: CDM  
=====

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes Number of Data Points = 3450  
Area reject = 1000 One Data Point per 0.2 seconds  
Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF HEIGHT	BL PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	1.986e+001	3.223e+003	493	1	0 0.00%
2	1.38		0.000e+000	1.031e+003	149	1	
3	1.93	NITRITE	1.467e+002	9.369e+003	1239	1	0 0.00%
4	3.52	NITRATE	5.977e+002	3.801e+004	2887	1	0 0.00%
5	7.17	SULFATE	4.085e+001	2.343e+003	132	1	0 0.00%

File: A:\90040500.D10 Sample: 475



DATA REPROCESSED ON Thu Aug 23 13:24:13 1990

=====  
Sample Name: 476D Date: Thu Apr 05 14:47:21 1990  
Data File : A:\90040500.D11  
Method : c:\windows\ai400\method\sst.met  
ACI Address: 1 System : 1 Inject#: 11 Detector: CDM  
=====

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

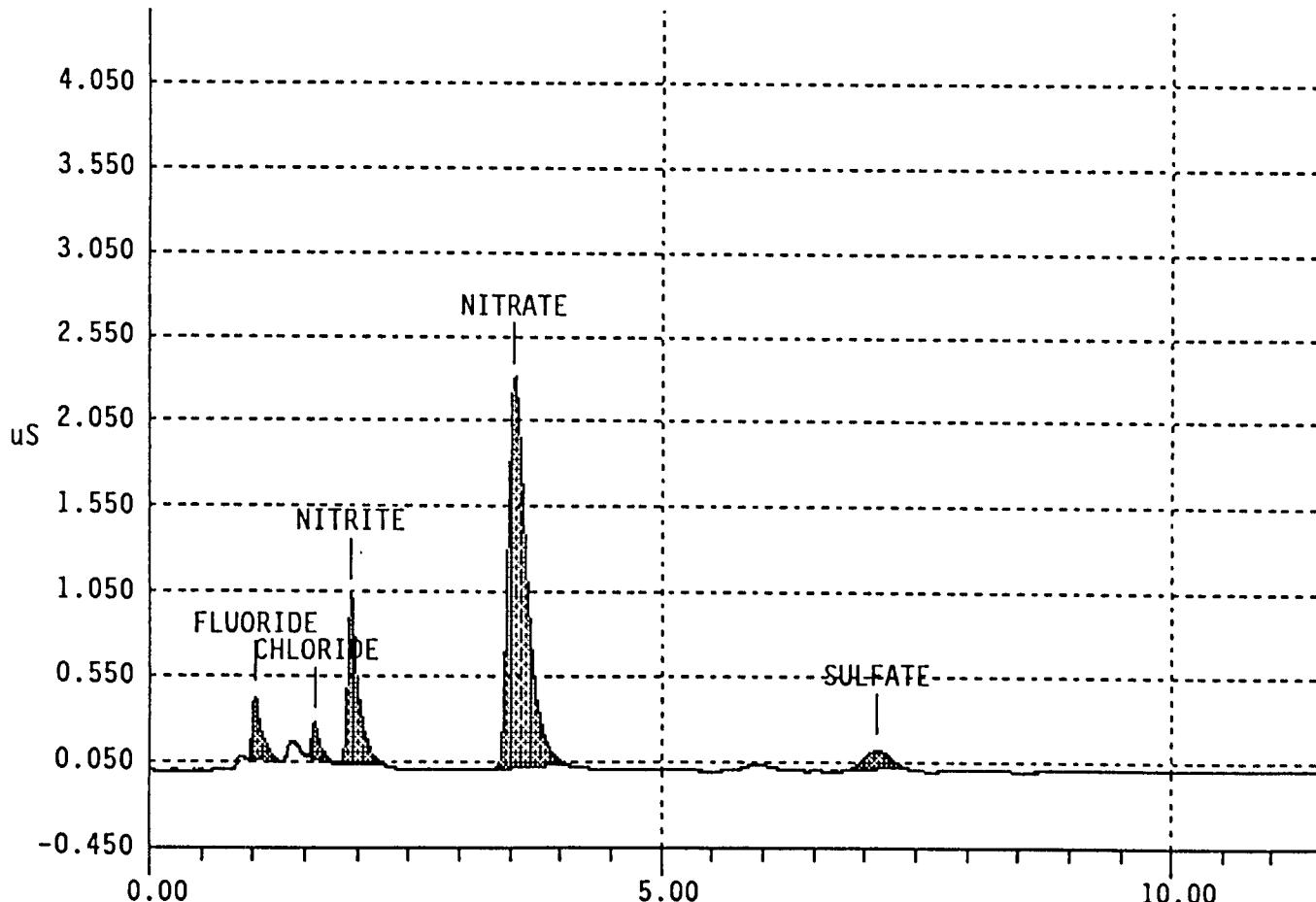
Stop time = 11.50 Minutes Number of Data Points = 3450

Area reject = 1000 One Data Point per 0.2 seconds

Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF	% DELTA	BL	PEAK	RET TIME
1	1.02	FLUORIDE	1.572e+001	2.360e+003	366	1	0	0.00%	
2	1.60	CHLORIDE	1.652e+001	1.143e+003	197	1	0	0.00%	
3	1.93	NITRITE	1.243e+002	7.294e+003	1000	1	0	0.00%	
4	3.53	NITRATE	4.702e+002	2.966e+004	2279	1	0	0.00%	
5	7.12	SULFATE	3.565e+001	1.927e+003	111	1	0	0.00%	

File: A:\90040500.D11 Sample: 476D



DATA REPROCESSED ON Thu Aug 23 13:17:53 1990

=====  
Sample Name: 429S Date: Thu Apr 05 13:58:17 1990  
Data File : A:\90040500.D07  
Method : c:\windows\ai400\method\sst.met  
ACI Address: 1 System : 1 Inject#: 7 Detector: CDM  
=====

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

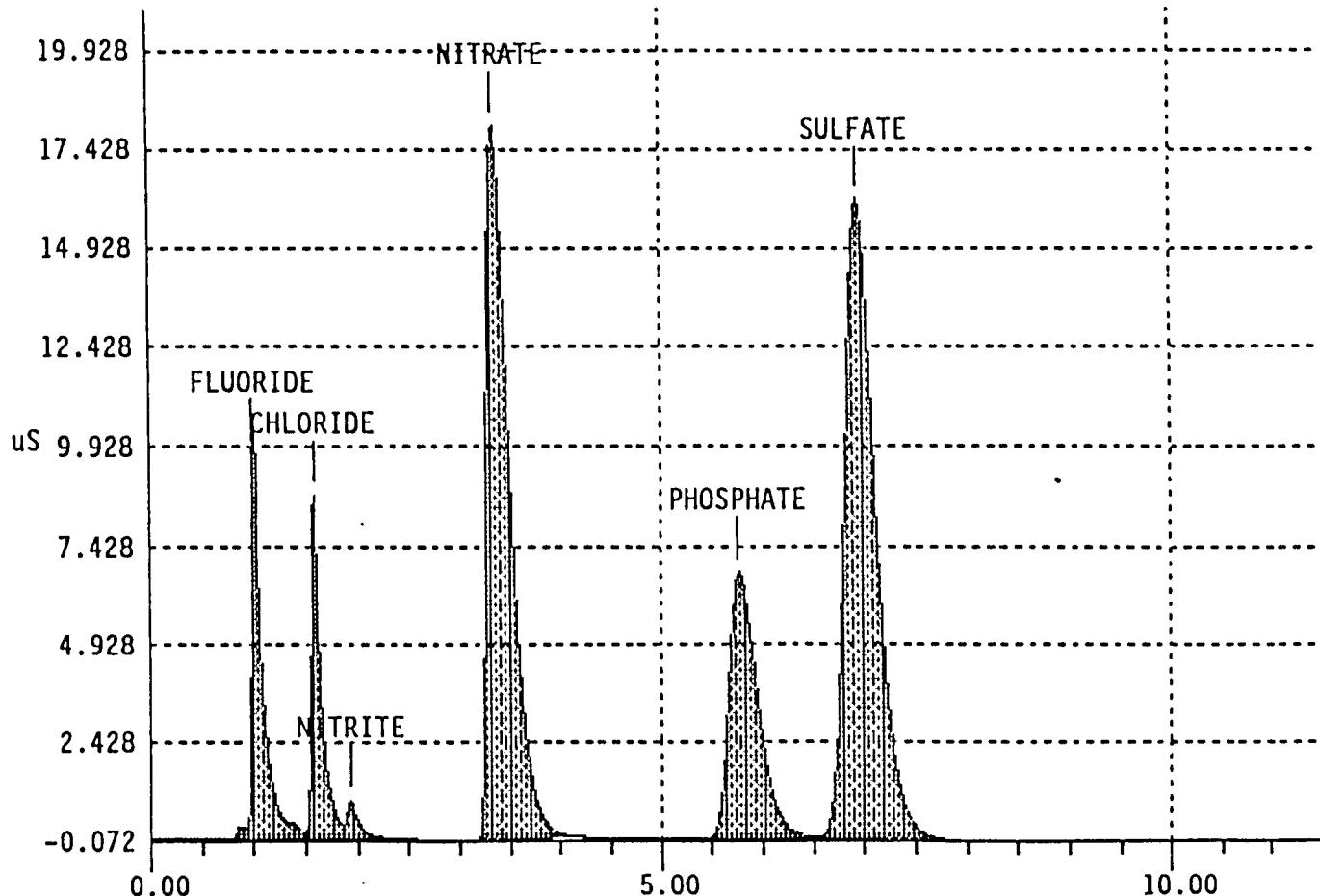
Stop time = 11.50 Minutes Number of Data Points = 3450

Area reject = 1000 One Data Point per 0.2 seconds

Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF HEIGHT	BL PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	3.052e+002	7.634e+004	9685	2	0 0.00%
2	1.58	CHLORIDE	4.348e+002	5.743e+004	8656	3	0 0.00%
3	1.93	NITRITE	1.089e+002	6.323e+003	836	4	0 0.00%
4	3.35	NITRATE	3.839e+003	2.908e+005	17987	1	0 0.00%
5	5.77	PHOSPHATE	3.452e+003	1.356e+005	6762	2	0 0.00%
6	6.93	SULFATE	3.527e+003	3.404e+005	16085	2	0 -6.31%

File: A:\90040500.D07 Sample: 429S



DATA REPROCESSED ON Thu Aug 23 13:37:04 1990

Sample Name: LMCS/6C11-HO F 0574

Date: Thu Apr 05 16:25:34 1990

Data File : A:\90040500.D19

Method : c:\windows\ai400\method\sst.met

ACI Address: 1 System : 1 Inject#: 19 Detector: CDM

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes

Number of Data Points = 3450

Area reject = 1000

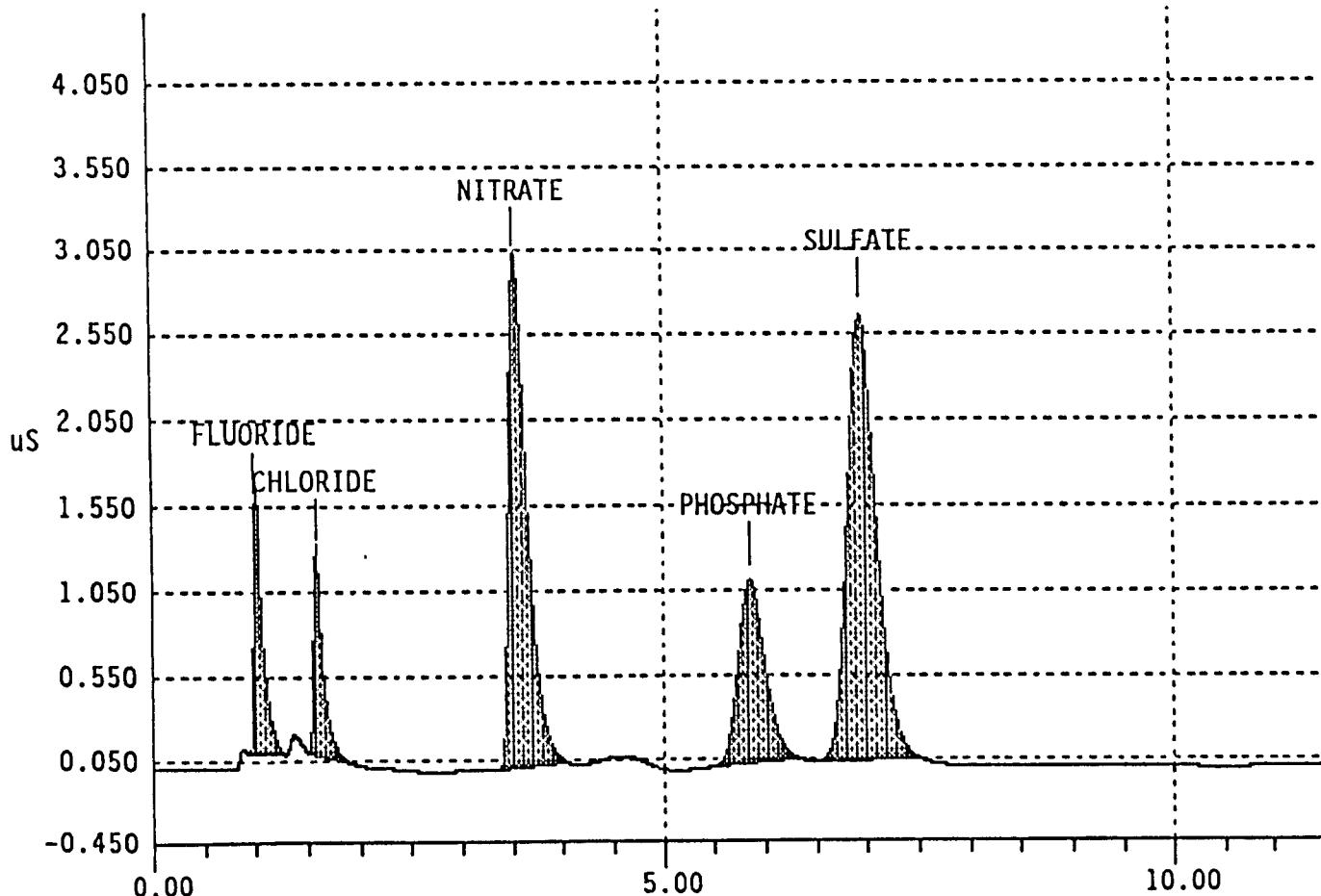
One Data Point per 0.2 seconds

Amount Injected = 1

Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF HEIGHT	BL PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	5.094e+001	9.493e+003	1451	1	0 0.00%
2	1.58	CHLORIDE	7.021e+001	7.816e+003	1180	1	0 0.00%
3	3.53	NITRATE	6.154e+002	3.890e+004	2971	1	0 0.00%
4	5.85	PHOSPHATE	6.079e+002	2.009e+004	1091	1	0 0.00%
5	6.95	SULFATE	6.252e+002	5.262e+004	2619	1	0 -6.08%

File: A:\90040500.D19 Sample: LMCS/6C11-HO



# Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	WB24721
PROCEDURE/REV	LA-533-105/A-3
TECHNOLOGIST	N. E. Wright
DATE	April 12, 1990
TEMPERATURE	22.5 C
STARTING TIME	1100
ENDING TIME	1420
CHEMIST	H. S. Rich

Ion Chromatograph Analysis  
Water Digestion  
\* Run for Flouride only

	DESCRIPTION	LAB ID
1	Initial LMCS Check Std.	F0426
2	Reagent Blank	F0438
3	Sample 89-070	F0427
4	Duplicate Sample 89-070	F0428
5	Spike of Sample 89-070	F0429
6	Sample 89-071	F0451
7	Duplicate Sample 89-071	F0452
8	Sample 89-072	F0475
9	Duplicate Sample 89-072	F0476
10	Sample 89-075	F0547
11	Duplicate Sample 89-075	F0548

	DESCRIPTION	LAB ID
12	Sample 89-076	F0571
13	Final LMCS Check Std.	F0574
14		
15		
16		
17		
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY Book # & ALIQUOT VOL.	SECOND Book # & ALIQUOT VOL.	THIRD Bk# & ALQT.VOL.	FINAL VOL. OF STD.
LMCS Check Std.	6C11HO/100 uL			10.1 mL
Spike for 89-072	35C9-77/300 uL	F0427/50 uL		5.3 mL

# Single Shell Tank Calibration Record

ANALYTE: Ion Chromatograph

PROCEDURE: LA-533-105

REVISION: A-3

INSTRUMENT: DIONEX 4000

PROPERTY NUMBER: WB24271

TECHNOLOGIST: N.E. Wright

PAYROLL NUMBER: 6B107

DATE: April 11, 1990

CALIBRATION STANDARD ID: 35C9-79 issued April 10, 1990

ANALYTE CONCENTRATION: F 49 C1 66 PO<sub>4</sub> 609 NO<sub>3</sub> 611 SO<sub>4</sub> 596 (ppm)

TYPE OF CALIBRATION: Linear

COMMENTS:

## DIONEX METHOD PARAMETERS - SST.MET

## Detector Parameters

Number of Detectors.....	1
Detector 1 Type.....	CDM

## Report Options

Run Time (minutes).....	11.50
Detector 1 real time plot scale.....	20.00
Print Report.....	Yes
Print Replot.....	Yes
AutoScale Replot to Highest Peak.....	Yes
Print Retention Times on Chromatogram.....	Yes
List Peaks Not Found in this run.....	No
Report Unknowns found in run.....	Yes
Record Raw Data.....	Yes
Raw Data File Name: A:\90040979.D08	
Record Result Data.....	No

## Integration Parameters

Sampling Rate (seconds).....	0.20
Peak Threshold (mV or uS/data pt interval).....	0.400
Starting Peak Width (seconds).....	10.0
Peak Area Reject.....	1000

## Integration Timed Events

Time	Description
-----	-----

## Calibration Parameters

External or Internal Calibration.....	External
Calibrate by Area or Height.....	Height
Replace Or Average Calibrations.....	Replace
Number Of Levels for Calibration.....	6
Calibration fit type.....	Quadratic
Response Factor for unknown peaks.....	0.0
Default Injection Volume.....	1.0
Default Dilution Factor.....	1.0
Area Reject for Reference Peaks.....	1000
Percent Retention Time Window for Reference Peaks.....	5.0

Component # 1 FLUORIDE Retention Time 1.00  
 Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size  
 Least Squares Slope = 3.68480E-004  
 Least Squares Intercept = -1.99974E-004  
 Ka = -4.02362E-009

Level	Amount	Area	Height
1	9.78000E-002	1668	300
2	2.43800E-001	3642	607
3	4.85200E-001	9315	1320
4	9.60800E-001	18456	2776
5	1.88460E+000	35592	5385
6	3.62900E+000	83552	11233

Component # 2 CHLORIDE Retention Time 1.60  
 Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size  
 Least Squares Slope = 6.15991E-004  
 Least Squares Intercept = -3.39552E-002  
 Ka = -1.21610E-008

Level	Amount	Area	Height
1	1.31700E-001	2313	358
2	3.28400E-001	3676	587
3	6.53500E-001	6685	1135
4	1.29410E+000	14160	2092
5	2.53800E+000	28199	4705
6	4.88900E+000	62634	9921

Component # 3 NITRITE Retention Time 1.95  
 Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size  
 Least Squares Slope = 7.28693E-004  
 Least Squares Intercept = 2.72186E-001  
 Ka = 3.36454E-009

Level	Amount	Area	Height
1	1.18960E+000	9937	1360
2	2.99000E+000	25698	3515
3	5.95050E+000	53506	7323
4	1.17843E+001	114215	15244
5	2.39442E+001	218918	28443
6	4.45185E+001	440177	49476

Component # 4 NITRATE Retention Time 3.38  
 Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size  
 Least Squares Slope = 2.06336E-003  
 Least Squares Intercept = -2.78230E-001  
 Ka = 2.72813E-010

Level	Amount	Area	Height
1	1.21960E+000	7900	677
2	3.03980E+000	19225	1565
3	6.04950E+000	40617	3098
4	1.19800E+001	84027	6111
5	2.35000E+001	171346	11368
6	4.52600E+001	368906	22029

Component # 5 PHOSPHATE Retention Time 5.80  
 Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size  
 Least Squares Slope = 5.30474E-003  
 Least Squares Intercept = 1.89883E-001  
 Ka = -4.78291E-008

Level	Amount	Area	Height
1	1.21550E+000	3360	198
2	3.02990E+000	9889	536
3	6.02970E+000	20802	1103
4	1.19412E+001	43160	2270
5	2.34230E+001	88767	4565
6	4.51110E+001	186751	9238

Component # 6 SULFATE Retention Time 6.85  
 Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size  
 Least Squares Slope = 2.26381E-003  
 Least Squares Intercept = 6.72726E-003  
 Ka = -1.34143E-008

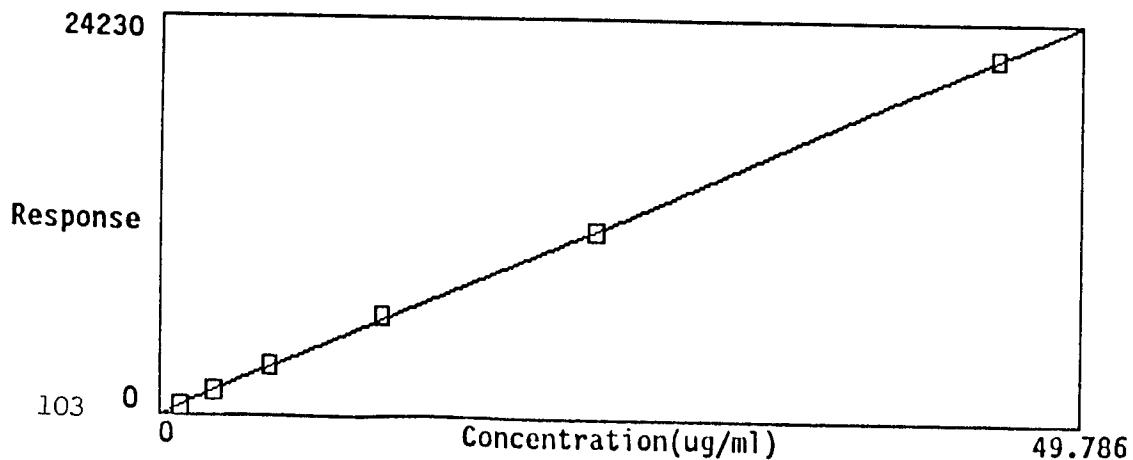
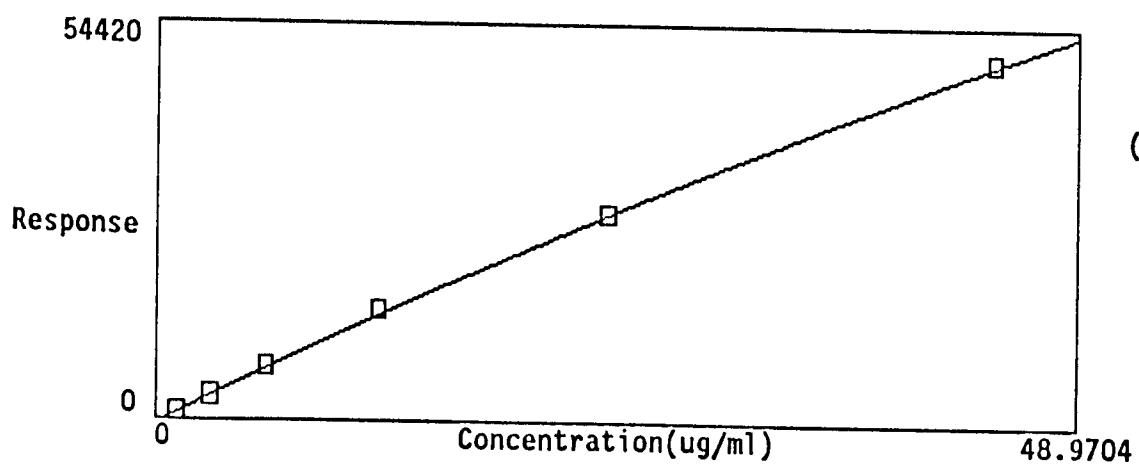
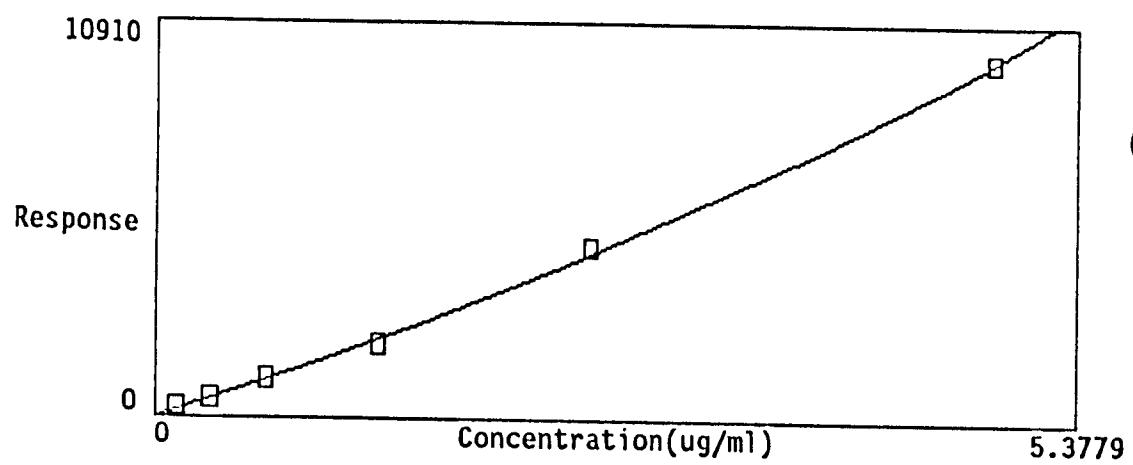
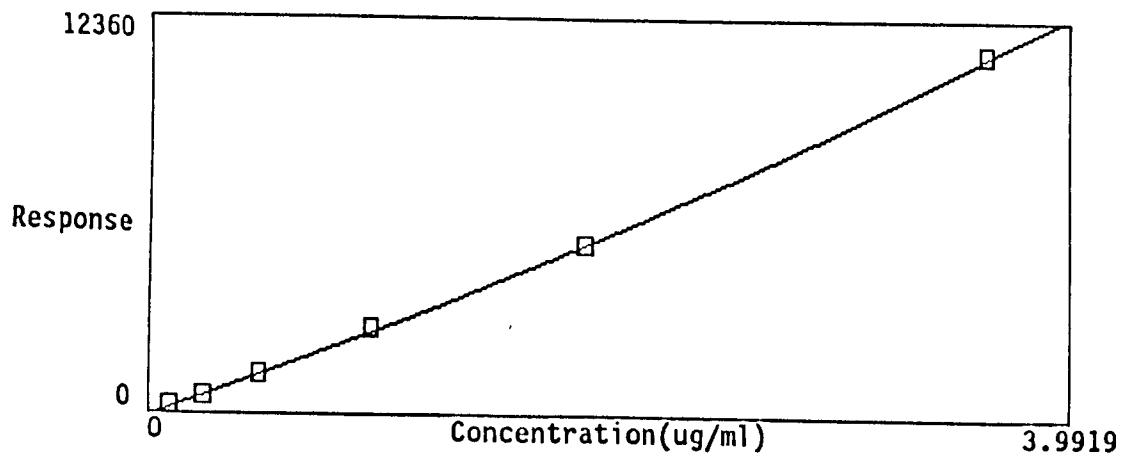
Level	Amount	Area	Height
1	1.18960E+000	10771	557
2	2.96520E+000	25693	1297
3	5.90100E+000	51993	2607
4	1.16860E+001	108657	5358
5	2.29231E+001	220178	10811
6	4.41480E+001	472662	22498

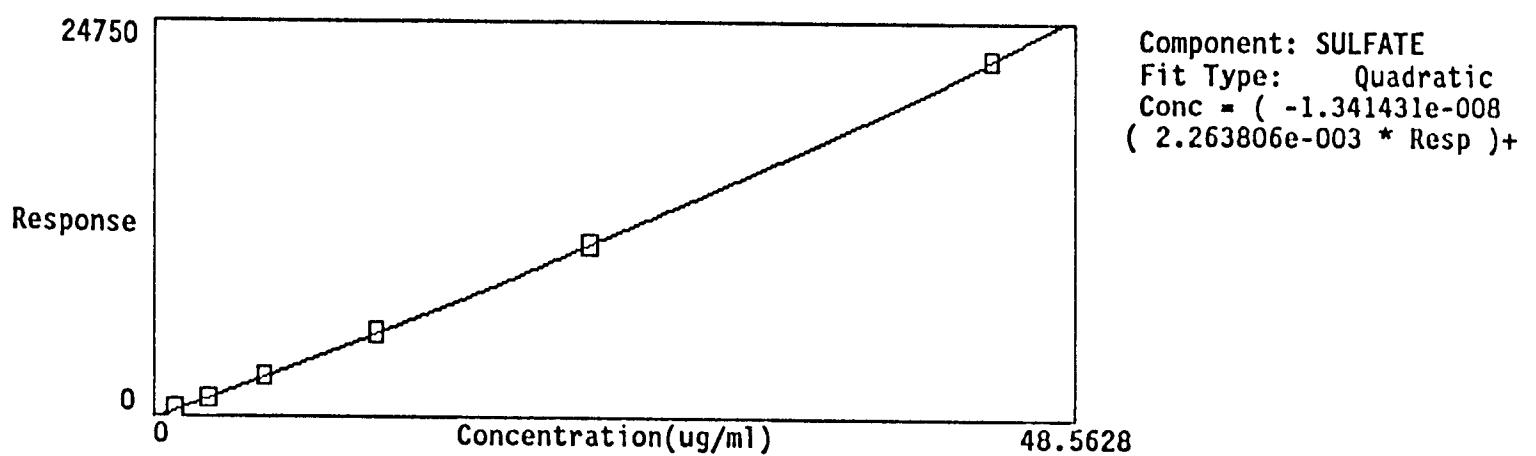
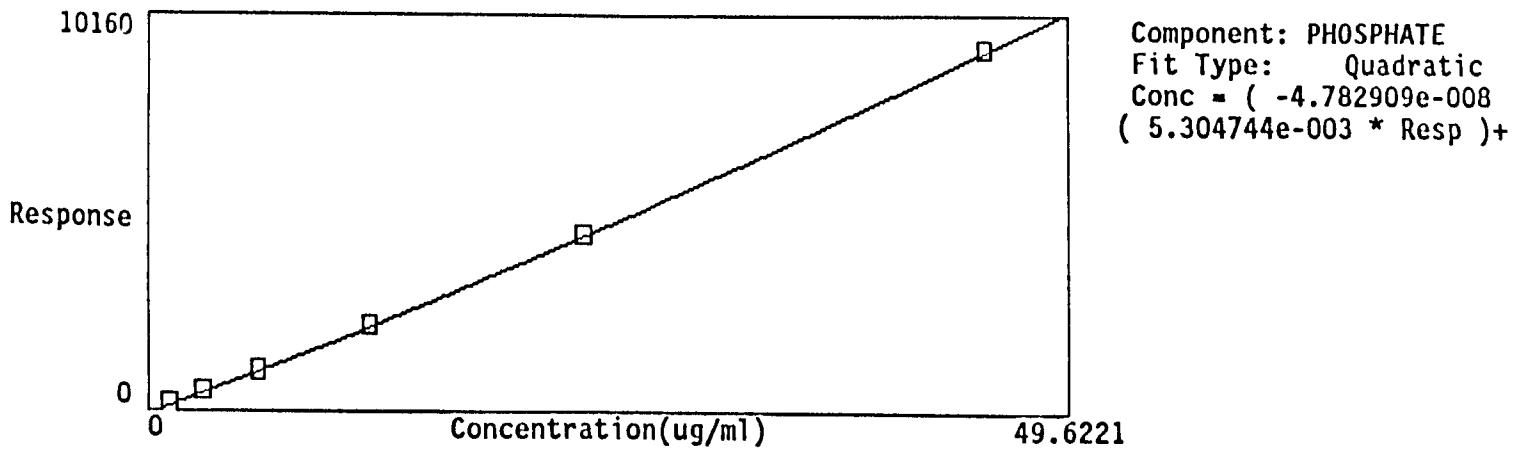
Component # 7 Oxalate Retention Time 9.77  
 Reference Peak FLUORIDE Window Size 10.00%  
 Least Squares Slope = 0.00000E+000  
 Least Squares Intercept = 0.00000E+000  
 Ka =

Level	Amount	Area	Height
1	0.00000E+000	0	0
2	0.00000E+000	0	0
3	0.00000E+000	0	0
4	0.00000E+000	0	0
5	0.00000E+000	0	0
6	0.00000E+000	98993	5848

IC Control File: C:\WINDOWS\AI400\METHOD\GROUT01.TE

Step	Time	Description
Init		CDM AutoOffset Off
Init		CDM Recorder Mark OFF
Init		CDM Temp. Comp. = 1.7 / Deg C
Init		CDM Recorder Range = 1.000 us
Init		CDM Cell ON
Init		CMA Heater = 25 Deg. C
Init		Valve A ON
Init		Valve B ON
Init		Inject Valve OFF
Init		CIM Relay 1 OFF
Init		CIM Relay 2 OFF
Init		CIM AC 1 OFF
Init		CIM AC 2 OFF
Init		GPM Start
Init		GPM Hold Gradient Clock
Init		GPM Reset ON
1	0.0	CDM AutoOffset ON
1	0.0	GPM Reset OFF
2	0.1	Inject Valve ON
2	0.1	GPM Run Gradient Clock
3	3.0	Inject Valve OFF
4	3.5	CIM Relay 1 ON
5	4.0	CIM Relay 1 OFF





\*\*\*\*\* AUTOMATIC CALIBRATION UPDATE \*\*\*\*\*  
Method File: C:\WINDOWS\AI400\METHOD\SST.MET  
Result File: CALDATA.R10  
Sample Name: AUTOCAL1R Calibration Level : 1  
Interface #: 1 Cycle #: 3 Result File Date: Wed Apr 11 10:22:06 1990  
Start time = 0 Stop time = 11.50  
Area reject = 1000 One DataPoint per 0.2 seconds  
Amount Injected = 1 Dilution factor = 1  
\*\*\*\*\* PEAKS NOT FOUND IN THIS RUN \*\*\*\*\*

Name	Adjusted Ret Time	Reference Peak
FLUORIDE	1.00	0
Oxalate	9.77	1

COMPONENTS FOUND IN THIS RUN							
COMP NUM	COMPONENT NAME	OLD RET. TIME	MEASURED RET. TIME	NEW RET. TIME	OLD HEIGHT	MEASURED HEIGHT	NEW HEIGHT
2	CHLORIDE	1.60	1.60	1.60	3.580e+002	3.583e+002	3.583e+002
3	NITRITE	1.95	1.95	1.95	1.360e+003	1.360e+003	1.360e+003
4	NITRATE	3.38	3.67	3.67	4.680e+002	6.767e+002	6.767e+002
5	PHOSPHATE	5.80	6.00	6.00	1.800e+002	1.983e+002	1.983e+002
6	SULFATE	6.85	6.98	6.98	1.980e+002	5.565e+002	5.565e+002

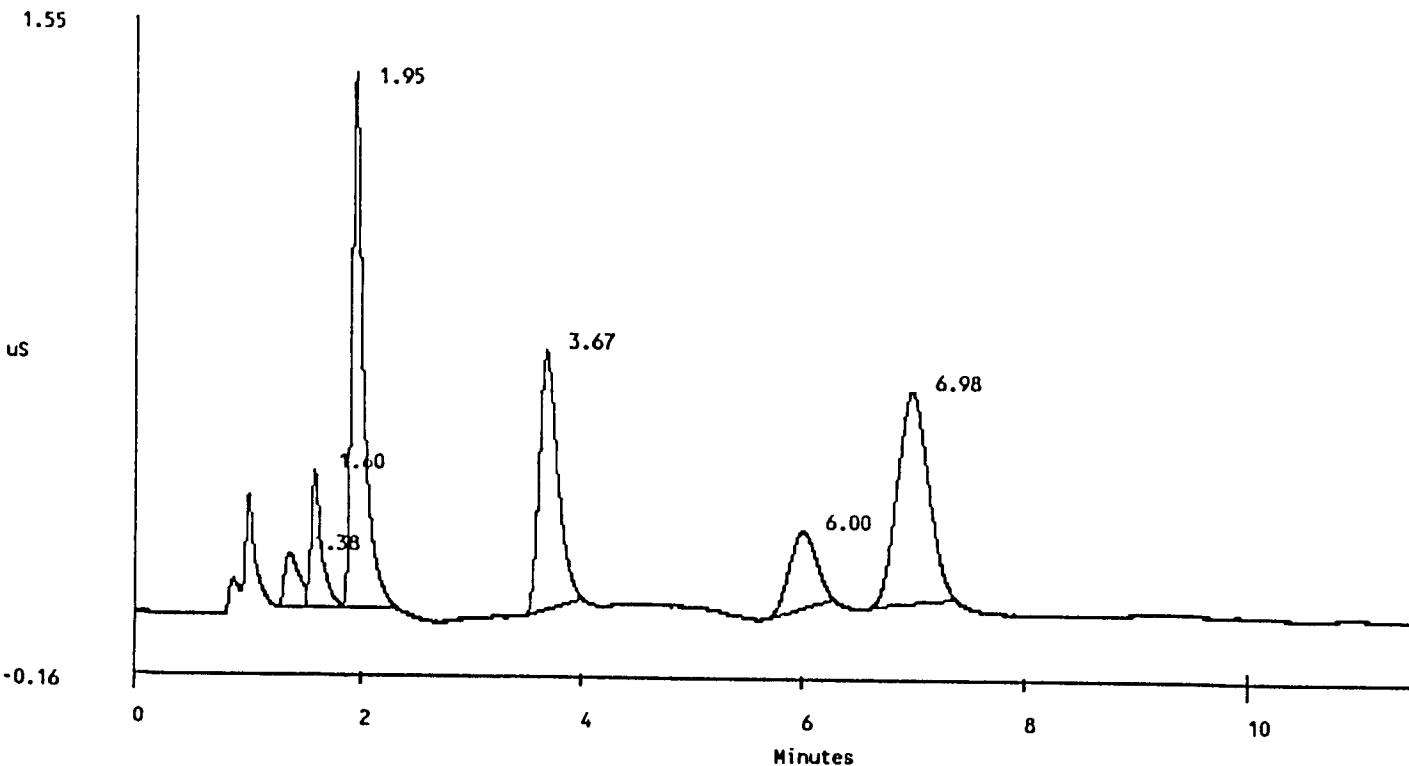
DATA REPROCESSED ON Mon Jul 16 10:15:06 1990

=====  
| Sample Name: AUTOCAL1R | Date: Wed Apr 11 10:22:06 1990 |  
| Data File : A:\90040979.D03 |  
| Method : C:\WINDOWS\AI400\METHOD\SST.MET |  
| CIM Address: 1 System : 1 Cycle #: 3 Detector: CDM |  
=====

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes Number of Data Points = 3451  
Area reject = 1000 One Data Point per 0.2 seconds  
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF HEIGHT	BL PEAK	% DELTA RET TIME
1	1.38		0.000e+000	1.225e+003	140	2	
2	1.60	CHLORIDE	1.317e-001	2.313e+003	358	2	0 0.00%
3	1.95	NITRITE	1.190e+000	9.937e+003	1360	2	0 0.00%
4	3.67	NITRATE	1.220e+000	7.900e+003	677	1	0 0.00%
5	6.00	PHOSPHATE	1.216e+000	3.360e+003	198	1	0 0.00%
6	6.98	SULFATE	1.190e+000	1.077e+004	557	1	0 0.00%



\*\*\*\*\* AUTOMATIC CALIBRATION UPDATE \*\*\*\*\*  
Method File: C:\WINDOWS\AI400\METHOD\SST.MET  
Result File: CALDATA.R10  
Sample Name: AUTOCAL2R Calibration Level : 2  
Interface #: 1 Cycle #: 4 Result File Date: Wed Apr 11 10:34:25 1990  
Start time = 0 Stop time = 11.50  
Area reject = 1000 One DataPoint per 0.2 seconds  
Amount Injected = 1 Dilution factor = 1  
\*\*\*\*\* PEAKS NOT FOUND IN THIS RUN \*\*\*\*\*

Name	Adjusted Ret Time	Reference Peak
Oxalate	9.77	1

COMPONENTS FOUND IN THIS RUN							
COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD HEIGHT	MEASURED HEIGHT	NEW HEIGHT
1	FLUORIDE	1.00	1.00	1.00	6.160e+002	6.067e+002	6.067e+002
2	CHLORIDE	1.60	1.60	1.60	4.890e+002	5.866e+002	5.866e+002
3	NITRITE	1.95	1.95	1.95	3.515e+003	3.515e+003	3.515e+003
4	NITRATE	3.67	3.63	3.63	1.234e+003	1.565e+003	1.565e+003
5	PHOSPHATE	6.00	5.98	5.98	4.370e+002	5.364e+002	5.364e+002
6	SULFATE	6.98	6.97	6.97	9.220e+002	1.297e+003	1.297e+003

DATA REPROCESSED ON Mon Jul 16 10:16:39 1990

=====

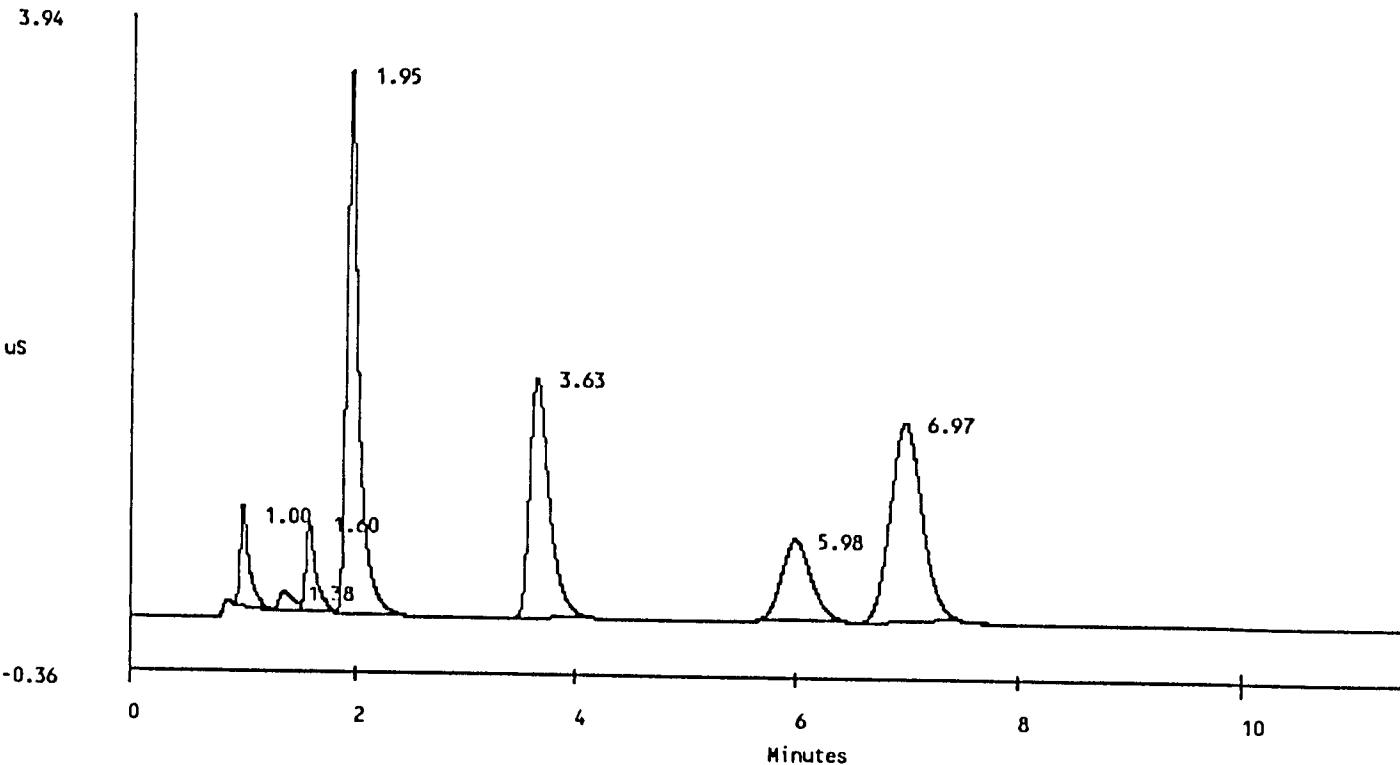
Sample Name: AUTOCAL2R	Date: Wed Apr 11 10:34:25 1990
Data File : A:\90040979.D04	
Method : C:\WINDOWS\AI400\METHOD\SST.MET	
CIM Address: 1	System : 1 Cycle#: 4 Detector: CDM

=====

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes Number of Data Points = 3451  
Area reject = 1000 One Data Point per 0.2 seconds  
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in		REF HEIGHT	BL	PEAK	% DELTA
			ug/ml	AREA				
1	1.00	FLUORIDE	2.438e-001	3.642e+003	607	1	0	0.00%
2	1.38		0.000e+000	1.159e+003	132	2		
3	1.60	CHLORIDE	3.284e-001	3.676e+003	587	2	0	0.00%
4	1.95	NITRITE	2.990e+000	2.570e+004	3515	2	0	0.00%
5	3.63	NITRATE	3.040e+000	1.923e+004	1565	1	0	0.00%
6	5.98	PHOSPHATE	3.030e+000	9.889e+003	536	1	0	0.00%
7	6.97	SULFATE	2.965e+000	2.569e+004	1297	1	0	0.00%



\*\*\*\*\* AUTOMATIC CALIBRATION UPDATE \*\*\*\*\*  
Method File: C:\WINDOWS\AI400\METHOD\SST.MET  
Result File: CALDATA.R10  
Sample Name: AUTOCAL3R Calibration Level : 3  
Interface #: 1 Cycle #: 5 Result File Date: Wed Apr 11 10:46:43 1990  
Start time = 0 Stop time = 11.50  
Area reject = 1000 One DataPoint per 0.2 seconds  
Amount Injected = 1 Dilution factor = 1  
\*\*\*\*\* PEAKS NOT FOUND IN THIS RUN \*\*\*\*\*

Name	Adjusted Ret Time	Reference Peak
Oxalate	9.77	1

\*\*\*\*\* COMPONENTS FOUND IN THIS RUN \*\*\*\*\*

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD HEIGHT	MEASURED HEIGHT	NEW HEIGHT
1	FLUORIDE	1.00	1.00	1.00	1.226e+003	1.320e+003	1.320e+003
2	CHLORIDE	1.60	1.60	1.60	1.017e+003	1.135e+003	1.135e+003
3	NITRITE	1.95	1.95	1.95	7.323e+003	7.323e+003	7.323e+003
4	NITRATE	3.63	3.58	3.58	2.460e+003	3.098e+003	3.098e+003
5	PHOSPHATE	5.98	5.97	5.97	9.480e+002	1.103e+003	1.103e+003
6	SULFATE	6.97	6.97	6.97	1.890e+003	2.607e+003	2.607e+003

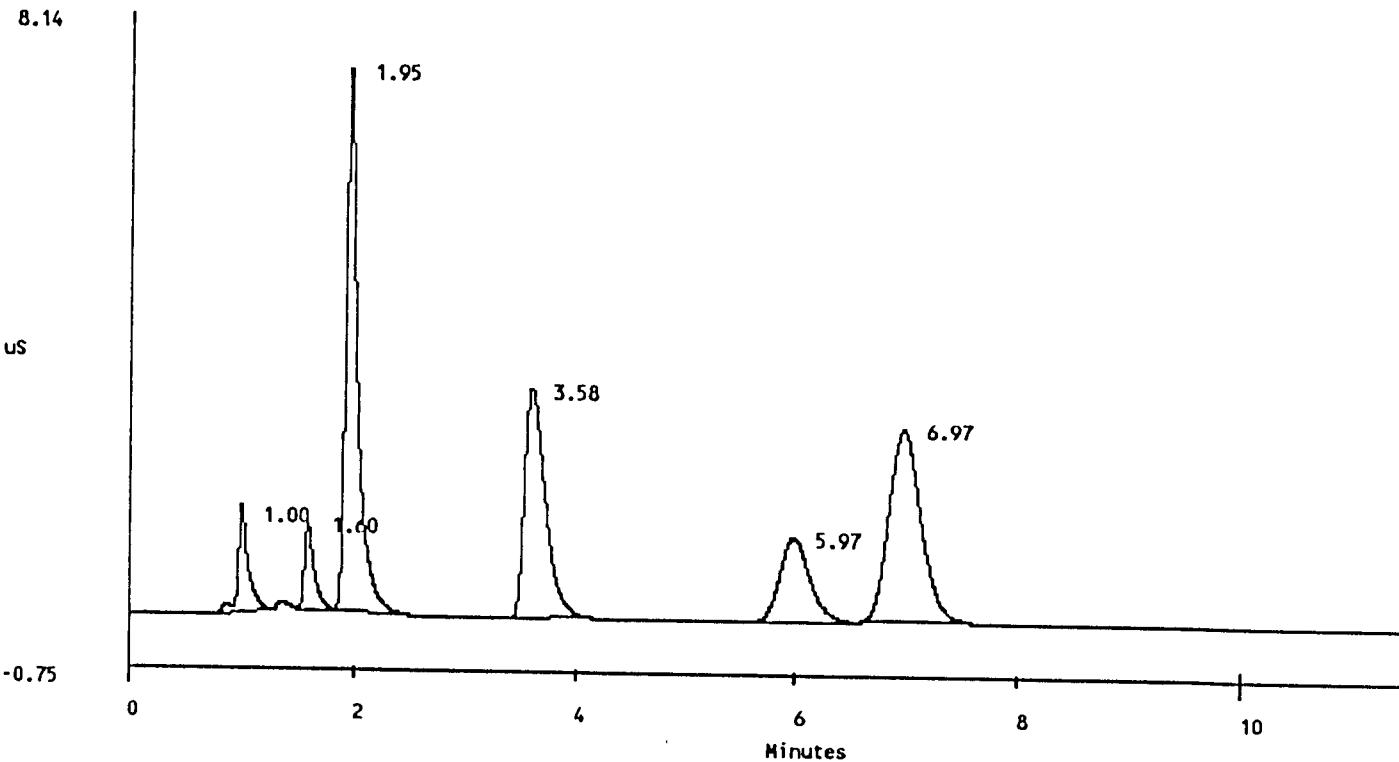
DATA REPROCESSED ON Mon Jul 16 10:17:20 1990

=====  
Sample Name: AUTOCAL3R Date: Wed Apr 11 10:46:43 1990  
Data File : A:\90040979.D05  
Method : C:\WINDOWS\AI400\METHOD\SST.MET  
CIM Address: 1 System : 1 Cycle#: 5 Detector: CDM  
=====

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes Number of Data Points = 3450  
Area reject = 1000 One Data Point per 0.2 seconds  
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF HEIGHT	BL PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	4.852e-001	9.315e+003	1320	1	0 0.00%
2	1.60	CHLORIDE	6.535e-001	6.685e+003	1135	1	0 0.00%
3	1.95	NITRITE	5.951e+000	5.351e+004	7323	1	0 0.00%
4	3.58	NITRATE	6.050e+000	4.062e+004	3098	1	0 0.00%
5	5.97	PHOSPHATE	6.030e+000	2.080e+004	1103	2	0 0.00%
6	6.97	SULFATE	5.901e+000	5.199e+004	2607	2	0 0.00%



\*\*\*\*\* AUTOMATIC CALIBRATION UPDATE \*\*\*\*\*  
Method File: C:\WINDOWS\AI400\METHOD\SST.MET  
Result File: CALDATA.R10  
Sample Name: AUTOCAL4R Calibration Level : 4  
Interface #: 1 Cycle #: 6 Result File Date: Wed Apr 11 10:59:03 1990  
Start time = 0 Stop time = 11.50  
Area reject = 1000 One DataPoint per 0.2 seconds  
Amount Injected = 1 Dilution factor = 1  
\*\*\*\*\* PEAKS NOT FOUND IN THIS RUN \*\*\*\*\*

Name	Adjusted Ret Time	Reference Peak
Oxalate	9.77	1

\*\*\*\*\* COMPONENTS FOUND IN THIS RUN \*\*\*\*\*

COMP NUM	COMPONENT NAME	OLD RET. TIME	MEASURED RET. TIME	NEW RET. TIME	OLD HEIGHT	MEASURED HEIGHT	NEW HEIGHT
1	FLUORIDE	1.00	1.00	1.00	2.625e+003	2.776e+003	2.776e+003
2	CHLORIDE	1.60	1.58	1.58	2.088e+003	2.092e+003	2.092e+003
3	NITRITE	1.95	1.95	1.95	1.524e+004	1.524e+004	1.524e+004
4	NITRATE	3.58	3.53	3.53	4.753e+003	6.111e+003	6.111e+003
5	PHOSPHATE	5.97	5.93	5.93	1.886e+003	2.270e+003	2.270e+003
6	SULFATE	6.97	6.93	6.93	4.005e+003	5.358e+003	5.358e+003

DATA REPROCESSED ON Mon Jul 16 10:17:59 1990

=====

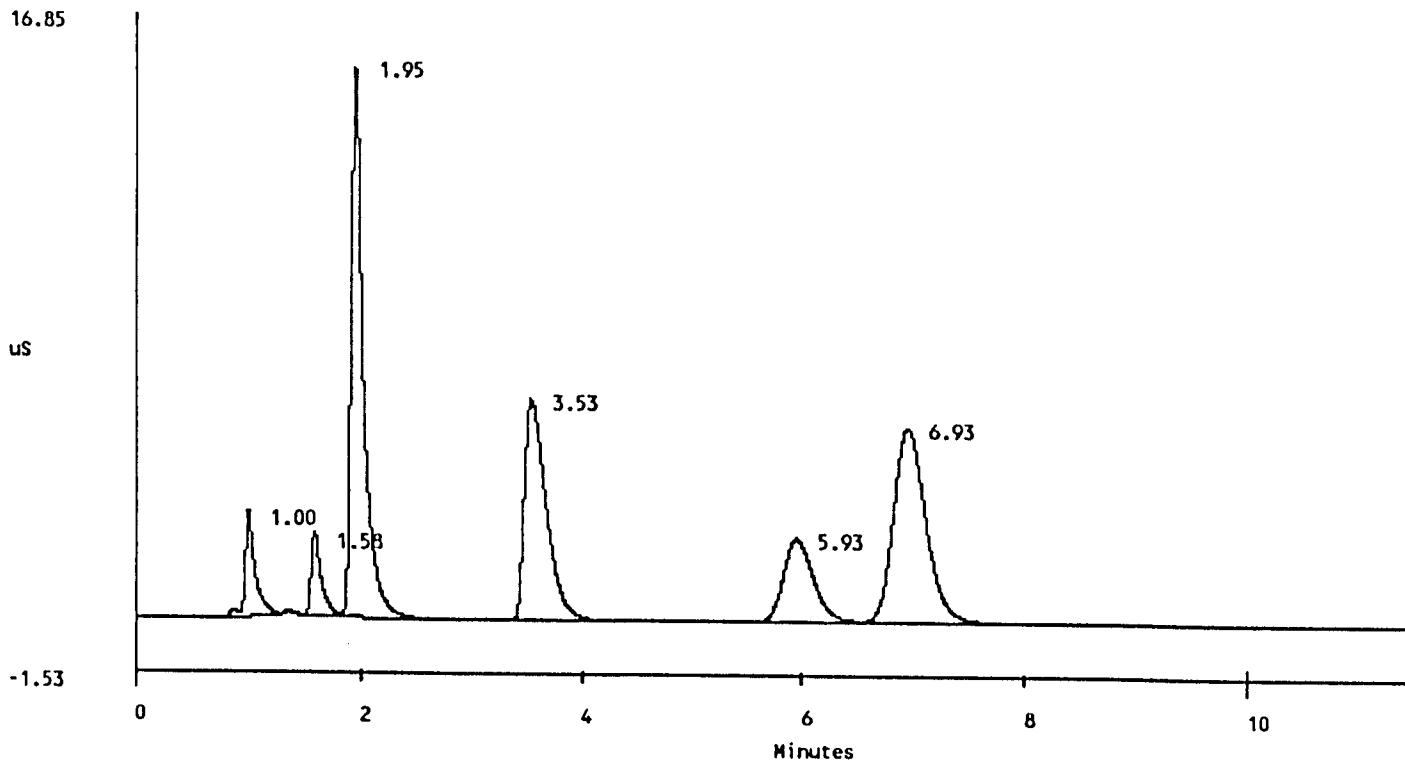
Sample Name: AUTOCAL4R	Date: Wed Apr 11 10:59:03 1990
Data File : A:\90040979.D06	
Method : C:\WINDOWS\AI400\METHOD\SST.MET	
CIM Address: 1	System : 1 Cycle#: 6
	Detector: CDM

=====

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes Number of Data Points = 3450  
Area reject = 1000 One Data Point per 0.2 seconds  
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF	% DELTA	BL PEAK	RET TIME
1	1.00	FLUORIDE	9.608e-001	1.846e+004	2776	1	0	0.00%
2	1.58	CHLORIDE	1.294e+000	1.416e+004	2092	2	0	0.00%
3	1.95	NITRITE	1.178e+001	1.142e+005	15244	2	0	0.00%
4	3.53	NITRATE	1.198e+001	8.403e+004	6111	1	0	0.00%
5	5.93	PHOSPHATE	1.194e+001	4.316e+004	2270	2	0	0.00%
6	6.93	SULFATE	1.169e+000	1.087e+005	5358	2	0	0.00%



\*\*\*\*\* AUTOMATIC CALIBRATION UPDATE \*\*\*\*\*  
Method File: C:\WINDOWS\AI400\METHOD\SST.MET  
Result File: CALDATA.R10  
Sample Name: AUTOCAL5R Calibration Level : 5  
Interface #: 1 Cycle #: 7 Result File Date: Wed Apr 11 11:11:21 1990  
Start time = 0 Stop time = 11.50  
Area reject = 1000 One DataPoint per 0.2 seconds  
Amount Injected = 1 Dilution factor = 1  
\*\*\*\*\* PEAKS NOT FOUND IN THIS RUN \*\*\*\*\*

Name	Adjusted Ret Time	Reference Peak
Oxalate	9.77	1

\*\*\*\*\* COMPONENTS FOUND IN THIS RUN \*\*\*\*\*

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD HEIGHT	MEASURED HEIGHT	NEW HEIGHT
1	FLUORIDE	1.00	1.00	1.00	5.315e+003	5.385e+003	5.385e+003
2	CHLORIDE	1.58	1.60	1.60	4.066e+003	4.705e+003	4.705e+003
3	NITRITE	1.95	1.95	1.95	2.844e+004	2.844e+004	2.844e+004
4	NITRATE	3.53	3.47	3.47	9.250e+003	1.137e+004	1.137e+004
5	PHOSPHATE	5.93	5.88	5.88	3.876e+003	4.565e+003	4.565e+003
6	SULFATE	6.93	6.90	6.90	8.158e+003	1.081e+004	1.081e+004

DATA REPROCESSED ON Mon Jul 16 10:18:38 1990

=====

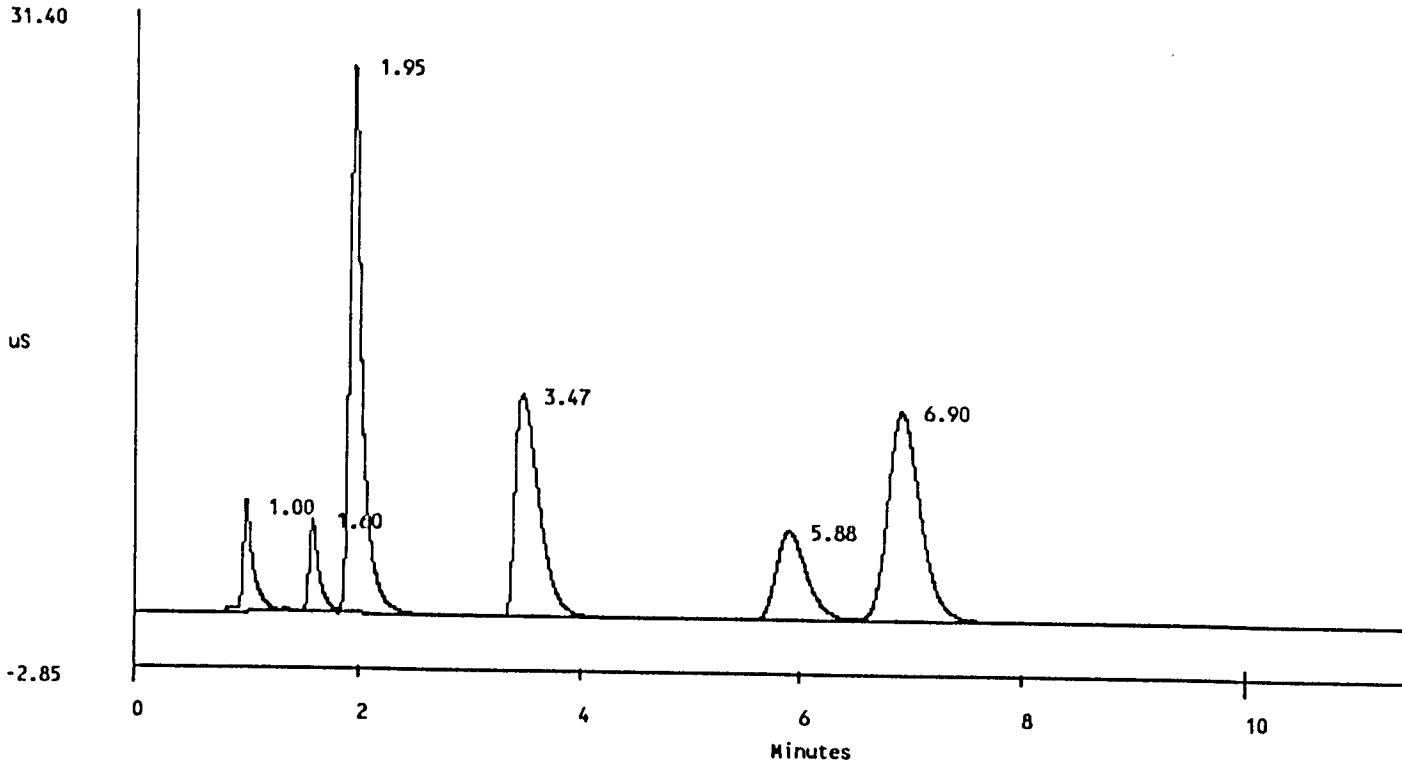
Sample Name: AUTOCAL5R	Date: Wed Apr 11 11:11:21 1990
Data File : A:\90040979.D07	
Method : C:\WINDOWS\AI400\METHOD\SST.MET	
CIM Address: 1	System : 1      Cycle #: 7      Detector: CDM

=====

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes                  Number of Data Points = 3450  
Area reject = 1000                  One Data Point per 0.2 seconds  
Amount Injected = 1                  Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF HEIGHT	BL PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	1.885e+000	3.559e+004	5385	1	0    0.00%
2	1.60	CHLORIDE	2.538e+000	2.820e+004	4705	2	0    0.00%
3	1.95	NITRITE	2.394e+001	2.189e+005	28443	2	0    0.00%
4	3.47	NITRATE	2.350e+004	1.713e+005	11368	1	0    0.00%
5	5.88	PHOSPHATE	2.342e+001	8.877e+004	4565	2	0    0.00%
6	6.90	SULFATE	2.292e+001	2.202e+005	10811	2	0    0.00%



\*\*\*\*\* AUTOMATIC CALIBRATION UPDATE \*\*\*\*\*  
Method File: C:\WINDOWS\AI400\METHOD\SST.MET  
Result File: CALDATA.R10  
Sample Name: AUTOCAL6R Calibration Level : 6  
Interface #: 1 Cycle #: 8 Result File Date: Wed Apr 11 11:23:42 1990  
Start time = 0 Stop time = 11.50  
Area reject = 1000 One DataPoint per 0.2 seconds  
Amount Injected = 1 Dilution factor = 1  
\*\*\*\*\* PEAKS NOT FOUND IN THIS RUN \*\*\*\*\*

Name	Adjusted Ret Time	Reference Peak
Oxalate	9.77	1

\*\*\*\*\* COMPONENTS FOUND IN THIS RUN \*\*\*\*\*

COMP NUM	COMPONENT NAME	OLD RET. TIME	MEASURED RET. TIME	NEW RET. TIME	OLD HEIGHT	MEASURED HEIGHT	NEW HEIGHT
1	FLUORIDE	1.00	1.00	1.00	1.109e+004	1.123e+004	1.123e+004
2	CHLORIDE	1.60	1.60	1.60	9.183e+003	9.921e+003	9.921e+003
3	NITRITE	1.95	1.95	1.95	4.948e+004	4.948e+004	4.948e+004
4	NITRATE	3.47	3.38	3.38	1.747e+004	2.203e+004	2.203e+004
5	PHOSPHATE	5.88	5.80	5.80	8.003e+003	9.238e+003	9.238e+003
6	SULFATE	6.90	6.85	6.85	1.695e+004	2.250e+004	2.250e+004

DATA REPROCESSED ON Mon Jul 16 10:19:17 1990

Sample Name: AUTOCAL6R

Data File : A:\90040979.D08

Method : C:\WINDOWS\AI400\METHOD\SST.MET

CIM Address: 1 System : 1 Cycle#: 8 Detector: CDM

Date: Wed Apr 11 11:23:42 1990

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Stop time = 11.50 Minutes

Number of Data Points = 3450

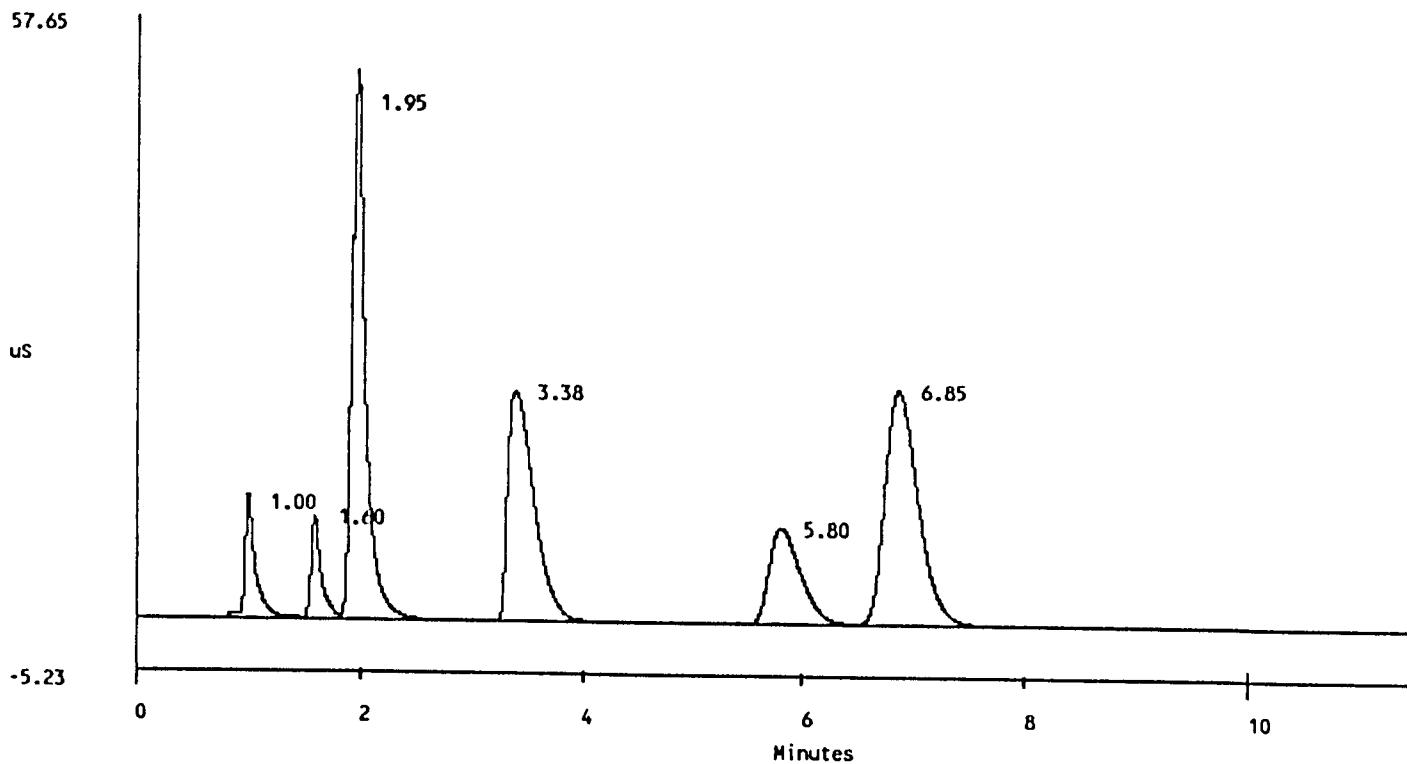
Area reject = 1000

One Data Point per 0.2 seconds

Amount Injected = 1

Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF HEIGHT	BL PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	3.629e+000	8.355e+004	11233	2	0 0.00%
2	1.60	CHLORIDE	4.889e+000	6.263e+004	9921	2	0 0.00%
3	1.95	NITRITE	4.452e+001	4.402e+005	49476	2	0 0.00%
4	3.38	NITRATE	4.526e+001	3.689e+005	22029	1	0 0.00%
5	5.80	PHOSPHATE	4.511e+001	1.868e+005	9238	2	0 0.00%
6	6.85	SULFATE	4.415e+001	4.727e+005	22498	2	0 0.00%



## DIONEX SCHEDULE - A:\90041200.SCH

Inject	Sample Name	Method Name	Data File	Volume	Dilution	Int	Std
1	SETUP	c:\windows\ai	c:\windows\ai	1	1	0	
2	BLANK	c:\windows\ai	c:\windows\ai	1	1	0	
3	LMCS/6C11-HO	c:\windows\ai	c:\windows\ai	1	101	0	
4	438B	c:\windows\ai	c:\windows\ai	1	1	0	
5	427	c:\windows\ai	c:\windows\ai	1	1	0	
6	428D	c:\windows\ai	c:\windows\ai	1	101	0	
7	429S	c:\windows\ai	c:\windows\ai	1	101	0	
8	451	c:\windows\ai	c:\windows\ai	1	101	0	
9	452D	c:\windows\ai	c:\windows\ai	1	101	0	
10	475	c:\windows\ai	c:\windows\ai	1	101	0	
11	476D	c:\windows\ai	c:\windows\ai	1	101	0	
12	547	c:\windows\ai	c:\windows\ai	1	101	0	
13	548D	c:\windows\ai	c:\windows\ai	1	101	0	
14	571	c:\windows\ai	c:\windows\ai	1	101	0	
15	572D	c:\windows\ai	c:\windows\ai	1	101	0	
16	983	c:\windows\ai	c:\windows\ai	1	101	0	
17	984D	c:\windows\ai	c:\windows\ai	1	21	0	
18	LMCS/6C11-HO	c:\windows\ai	c:\windows\ai	1	21	0	
					101	0	

```

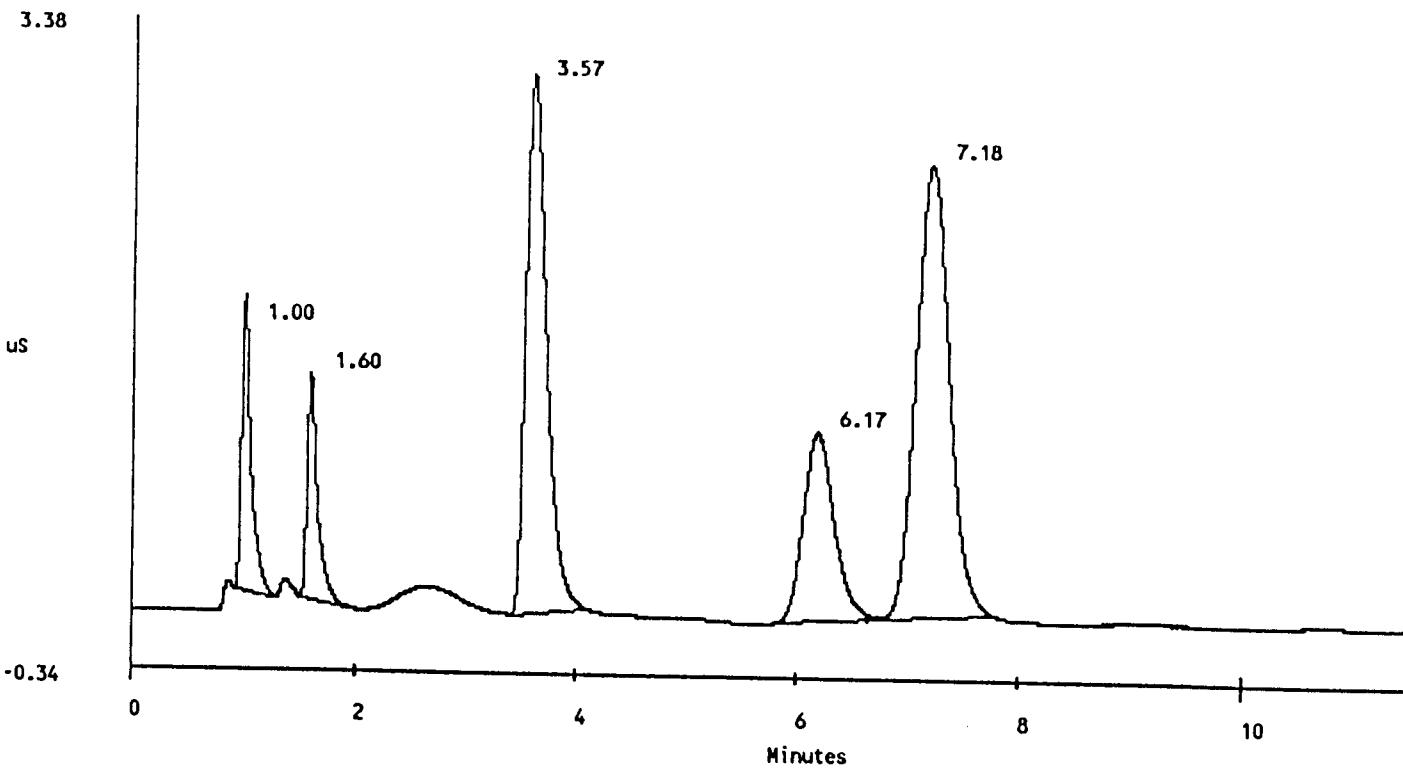
=====
| Sample Name: LMCS/6C11-HO           Date: Thu Apr 12 11:33:35 1990 |
| Data File : 90041200.D03          |
| Method    : c:\windows\ai400\method\sst.met |
| CIM Address: 1      System : 1      Cycle#: 3      Detector: CDM |
=====

```

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Start Time = 0.00 minutes Stop time = 11.50 Minutes  
Number of Data Points = 3451 One Data Point per 0.2 seconds  
Areareject = 1000  
Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	REF	% DELTA	BL	PEAK	RET	TIME
1	1.00	FLUORIDE	5.450e+001	9.780e+003	1489	1	0	0.00%		
2	1.60	CHLORIDE	7.288e+001	7.890e+003	1258	1	0	0.00%		
3	3.57	NITRATE	5.993e+002	3.943e+004	3009	1	0	5.42%		
4	6.17	PHOSPHATE	5.816e+002	2.084e+004	1060	2	0	6.32%		
5	7.18	SULFATE	5.781e+002	5.320e+004	2564	2	0	4.87%		

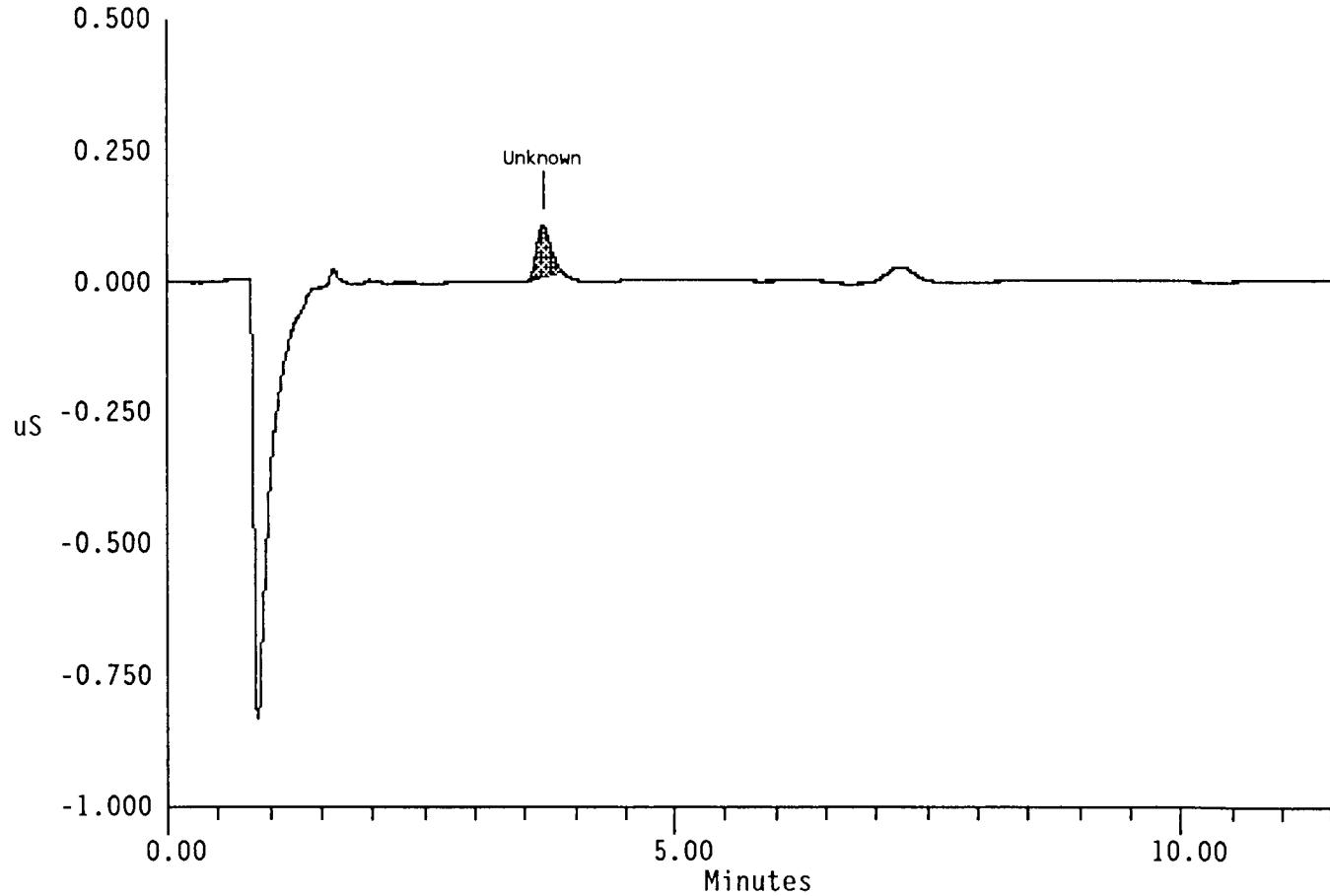


DATA REPROCESSED ON Mon Oct 08 08:14:08 1990

```
=====
| Sample Name: 438B                               Date: Thu Apr 12 12:45:50 1990 |
| Data File  : A:\90041200.D04                 |
| Method     : c:\windows\ai400\method\sst.met   |
| ACI Address: 1       System : 1      Inject#: 4  Detector: CDM-1 |
=====
```

REPORT	VOLUME	DILUTION	POINTS	RATE	START	STOP	AREA	REJ
External	1	1	3451	5Hz	0.00	11.50	1000	
Pk.	Ret Time	Component Name	Concentration			Height	Area	Bl. %Delta Code
Num								

File: A:\90041200.D04 Sample: 438B



```

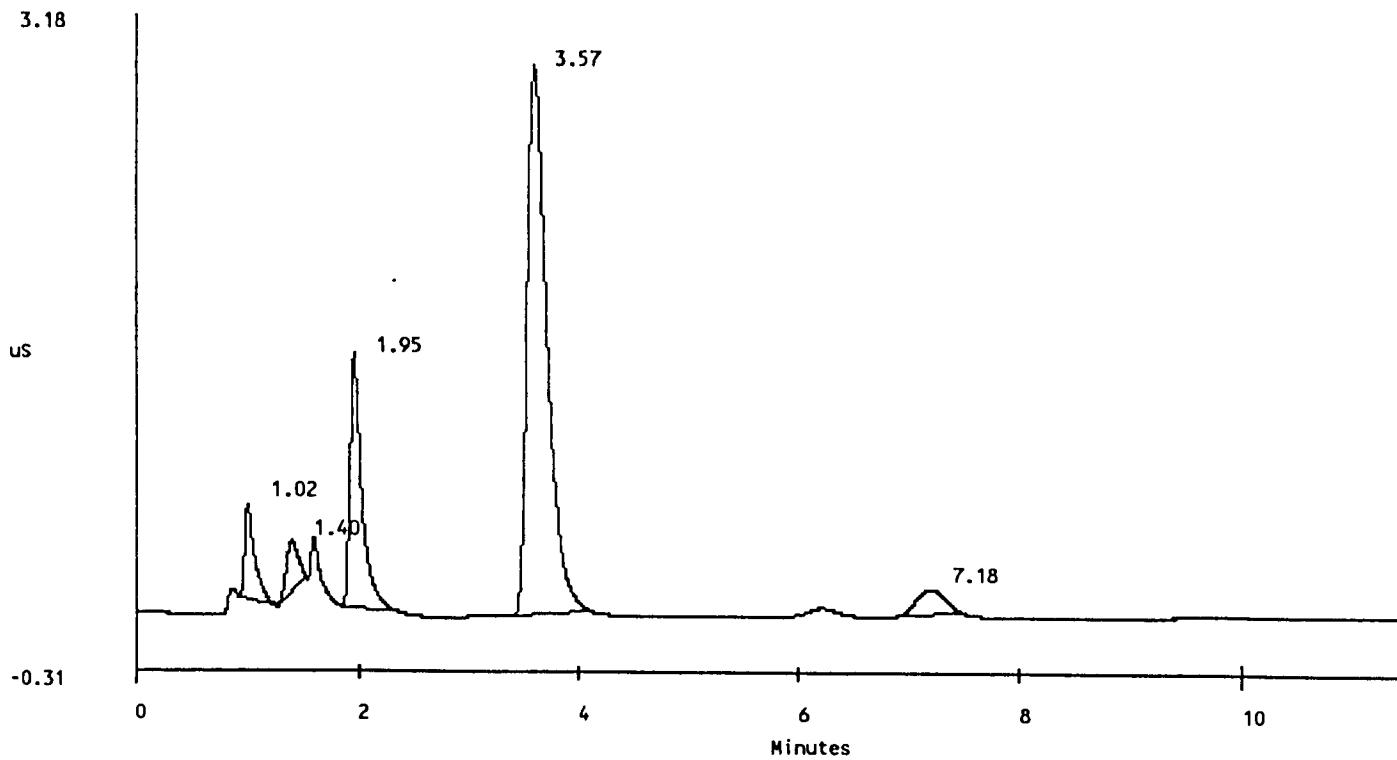
=====
| Sample Name: 475                               Date: Thu Apr 12 12:59:25 1990 |
| Data File : 90041200.D10                      |
| Method    : c:\windows\ai400\method\sst.met      |
| CIM Address: 1        System : 1     Cycle#: 10   Detector: CDM |
=====

```

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Start Time = 0.00 minutes Stop time = 11.50 Minutes  
 Number of Data Points = 3451 One Data Point per 0.2 seconds  
 Areareject = 1000  
 Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	REF	% DELTA	
						BL	PEAK	RET TIME
1	1.02	FLUORIDE	1.865e+001	3.115e+003	504	1	0	1.67%
2	1.40		0.000e+000	1.978e+003	272	1		
3	1.95	NITRITE	1.252e+002	9.586e+003	1320	1	0	0.00%
4	3.57	NITRATE	5.706e+002	3.677e+004	2872	1	0	5.42%
5	7.18	SULFATE	3.209e+001	2.443e+003	137	1	0	4.87%



```

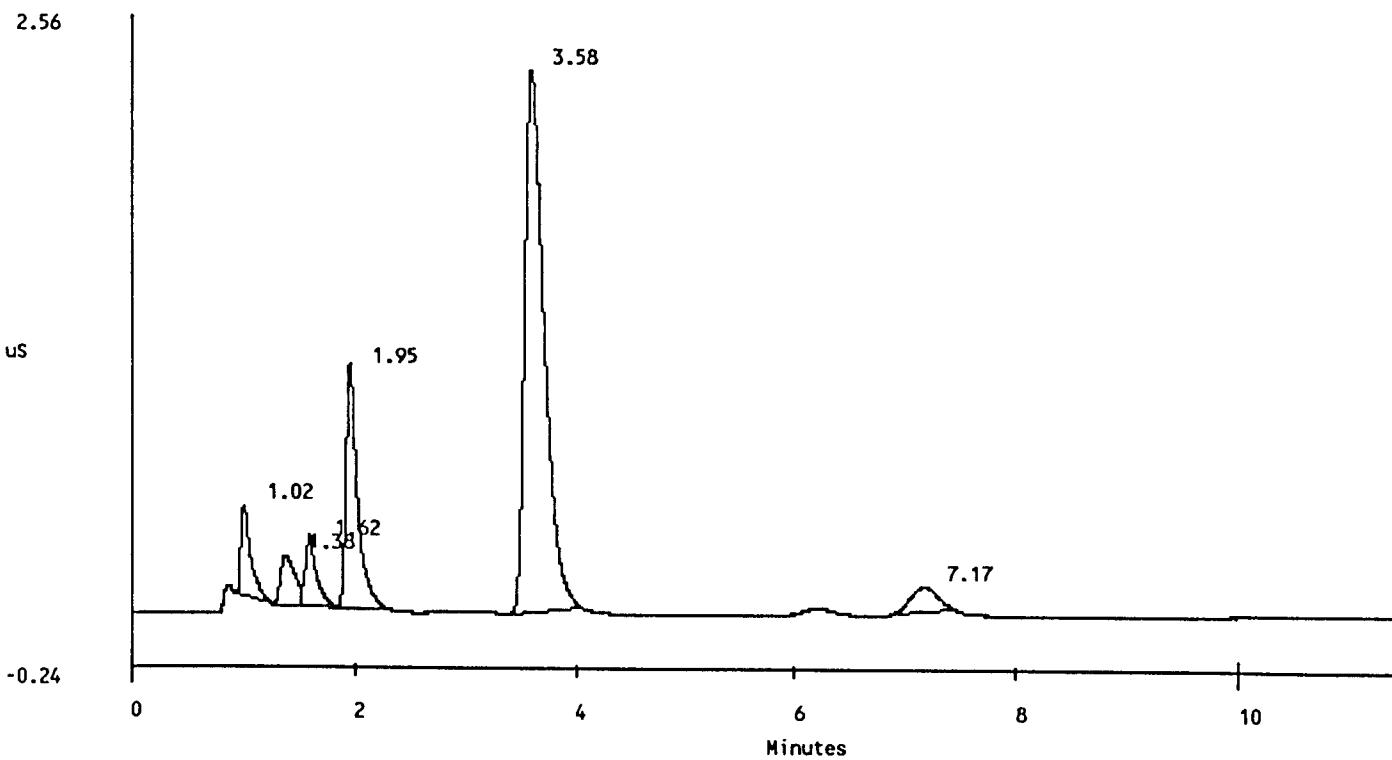
=====
| Sample Name: 476D           Date: Thu Apr 12 13:11:40 1990 |
| Data File  : 90041200.D11 |
| Method     : c:\windows\ai400\method\sst.met |
| CIM Address: 1      System : 1      Cycle#: 11      Detector: CDM |
=====

```

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Start Time = 0.00 minutes Stop time = 11.50 Minutes  
 Number of Data Points = 3450 One Data Point per 0.2 seconds  
 Areareject = 1000  
 Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in		REF	% DELTA	
			ug/ml	AREA			
1	1.02	FLUORIDE	1.419e+001	2.435e+003	384	1	0 1.67%
2	1.38		0.000e+000	1.818e+003	213	2	
3	1.62	CHLORIDE	1.368e+001	2.012e+003	277	2	0 1.04%
4	1.95	NITRITE	1.030e+002	7.316e+003	1020	2	0 0.00%
5	3.58	NITRATE	4.549e+002	2.918e+004	2317	1	0 5.91%
6	7.17	SULFATE	2.548e+001	1.902e+003	108	1	0 4.62%



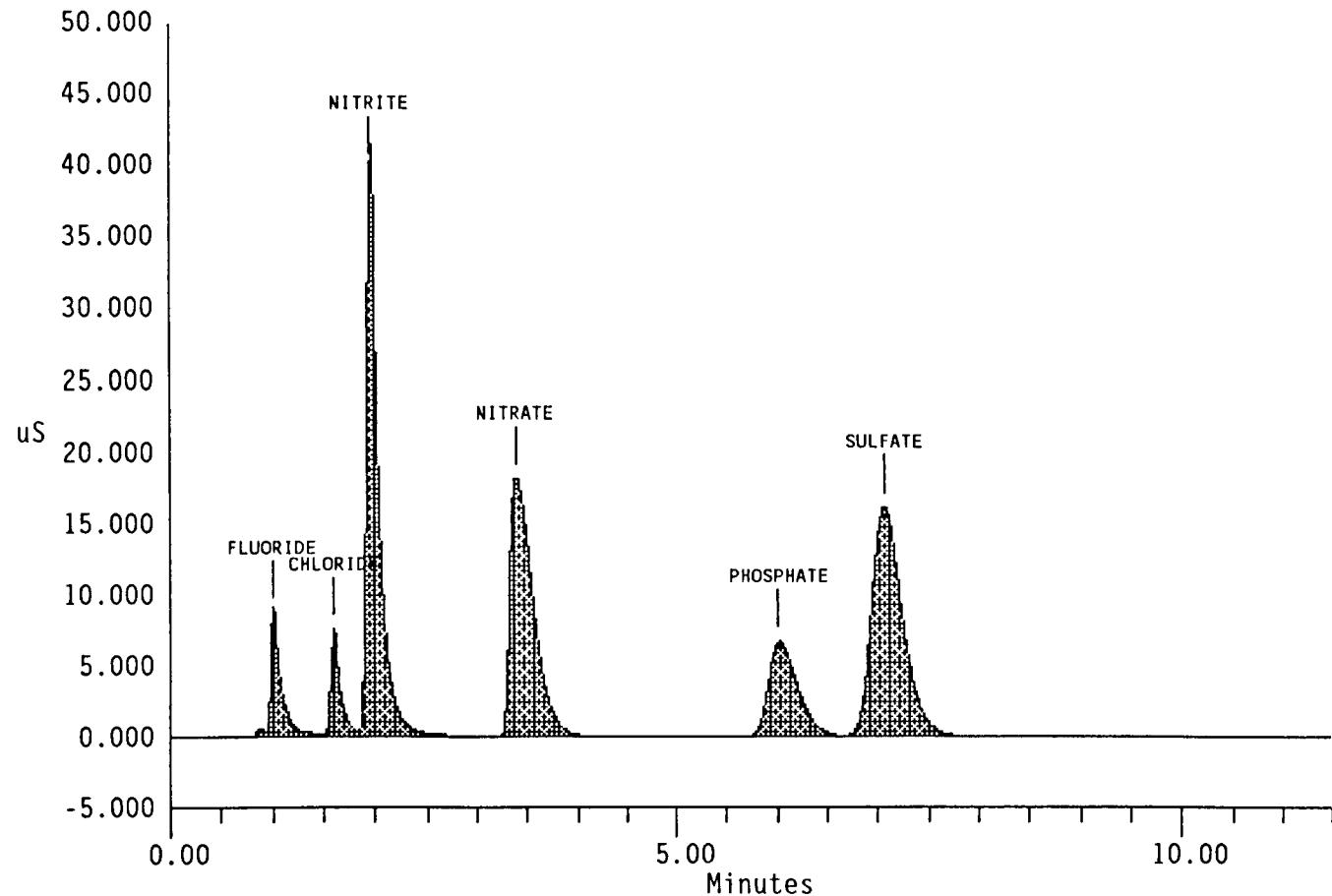
DATA REPROCESSED ON Mon Oct 08 08:11:35 1990

```
=====
| Sample Name: 429S                               Date: Thu Apr 12 13:22:35 1990 |
| Data File : A:\90041200.D07                 |
| Method    : c:\windows\ai400\method\sst.met   |
| ACI Address: 1       System : 1      Inject#: 7   Detector: CDM-1 |
=====
```

REPORT	VOLUME	DILUTION	POINTS	RATE	START	STOP	AREA	REJ
External	1	101	3450	5Hz	0.00	11.50	1000	

Pk. Num	Ret Time	Component Name	Concentration	Height	Area	B1. Code	%Delta
1	1.00	FLUORIDE	292.080	8669	67713	2	0.00
2	1.60	CHLORIDE	394.323	7505	48260	2	0.00
3	1.95	NITRITE	3479.557	39647	336532	2	0.00
4	3.38	NITRATE	3747.008	18071	293247	1	0.00
5	6.02	PHOSPHATE	3360.118	6632	135640	2	0.00
6	7.07	SULFATE	3334.760	16122	343503	2	0.00

File: A:\90041200.D07 Sample: 429S



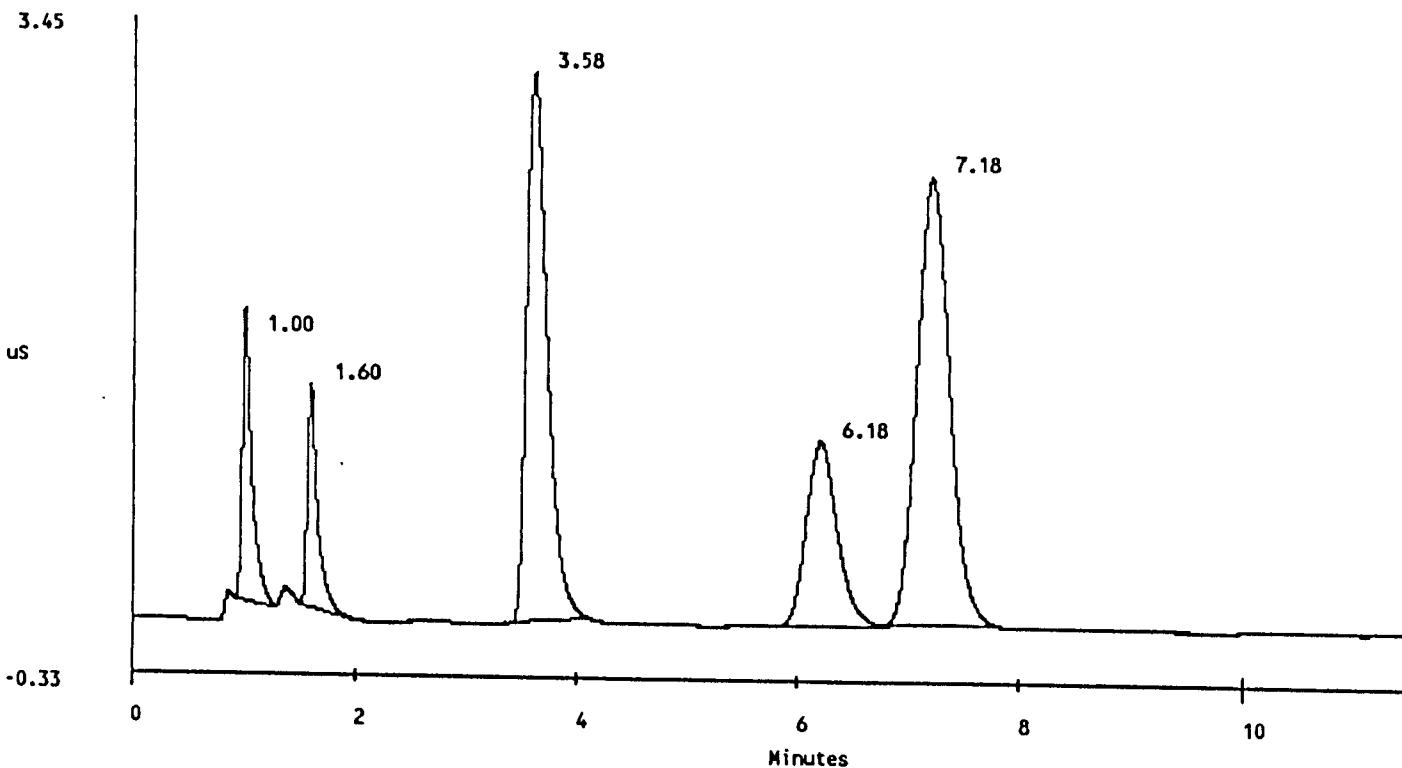
Sample Name: 6C11HO Date: Thu Apr 12 14:21:13 1990  
 Data File : 900-5485.D01  
 Method : C:\WINDOWS\AI400\METHOD\SST.MET  
 CIM Address: 1 System : 1 Cycle#: 1 Detector: CDM

\*\*\*\*\* EXTERNAL STANDARD REPORT \*\*\*\*\*

Start Time = 0.00 minutes Stop time = 11.50 Minutes  
 Number of Data Points = 3451 One Data Point per 0.2 seconds  
 Areareject = 1000  
 Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	<u>101</u>	REF	% DELTA
					HEIGHT	BL PEAK	RET TIME
1	1.00	FLUORIDE	5.455e-001	9.806e+003	1506	1	0 0.00%
2	1.60	CHLORIDE	7.267e-001	7.884e+003	1267	1	0 0.00%
3	3.58	NITRATE	6.182e+000	4.031e+004	3130	1	0 5.91%
4	6.18	PHOSPHATE	5.669e+000	2.050e+004	1043	2	0 6.61%
5	7.18	SULFATE	5.724e+000	5.282e+004	2564	2	0 4.87%

X 101



# Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	WB39937
PROCEDURE/Rev	LA-344-105/A-3
TECHNOLOGIST	E. Colvin
DATE	March 15, 1990
TEMPERATURE	N/A
STARTING TIME	0800
ENDING TIME	1100
CHEMIST	R. E. Brandt

Total Organic Carbon from water digestion.

	DESCRIPTION	LAB ID
1	Initial LMCS Check Std.	F0474
2	Reagent Blank	F0486
3	Sample 89-072	F0475
4	Duplicate Sample 89-072	F0476
5	Spike of Sample 89-072	F0477
6	Final LMCS Check Std.	F0478
7		
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11		

	DESCRIPTION	LAB ID
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STANDARD TYPE	PRIMARY Book # & ALIQUOT VOL.	SECOND Book # & ALIQUOT VOL.	THIRD Bk# & ALQ.T.VOL.	FINAL VOL. OF STD.
LMCS Check Standard	70C11C/200 uL			2.2 mL
Spike	80C11/200 uL	F0475/200 uL		0.5 mL

COULOMETER ANALYSIS REPORT  
TICTOC Rev. 0

Sample #: F-474

Date: 03-15-1990 Time: 06:04:30

Blank = .3711292  
% Difference = 10

Sample Size = 200 Dilution Factor = 11  
Min Readings = 7 Max Readings = 7

Reading	Analysis Time	Coulometer	% Difference
1	1.01	0.00	0.00
2	2.01	37.00	100.00
3	3.01	50.20	26.29
4	4.01	53.60	6.34
5	5.01	54.90	2.37
6	6.01	55.40	0.90
7	7.01	55.90	0.72

$$C_{55.6} = 2.600068 \times (11) / (200) = 0.925996 \text{ g/L Carbon}$$

$$C_{55.6} = 2.600068 \times (11) / (200) \times (12) = .243833 \text{ Molar Carbon}$$

Sample Run By: 90028

COULOMETER ANALYSIS REPORT  
TICTOC Rev. 0

Sample: F-486

Date: 03-15-1990 Time: 05:56:27

Blank = N/A                      Sample Size = 200    Dilution Factor = 1  
% Difference = 10                Min Readings = 7    Max Readings = 7

==== Reading =====	Analysis Time	Coulometer	% Difference ==
1	1.01	0.00	0.00
2	2.01	0.80	100.00
3	3.01	1.40	42.86
4	4.01	1.80	22.22
5	5.01	2.10	14.29
6	6.01	2.30	8.70
7	7.01	2.60	11.54

BLANK VALUE = 2.6 / 7.005646 = .3711292 ug/minute

Sample Run By: 80026

COULOMETER ANALYSIS REPORT  
TICTOC Rev. 0

Sample: F-475

Date: 03-15-1990 Time: 06:25:31

Blank = .3711292      Sample Size = 200      Dilution Factor = 1.1  
% Difference = 10      Min Readings = 7      Max Readings = 7

Reading	Analysis Time	Coulometer	% Difference
1	1.01	0.30	-18366.67
2	2.01	1.80	83.33
3	3.01	2.60	30.77
4	4.01	3.40	16.13
5	5.01	3.60	13.89
6	6.01	4.00	10.00
7	7.01	4.20	4.76

$$(4.2 - 2.600362) (1.1) / (200) = 0.799007E-03 \text{ g/L Carbon}$$

$$(4.2 - 2.600362) (1.1) / (200) (12) = 7.331672E-04 \text{ Molar Carbon}$$

Sample Run By: 80028

COULOMETRIC ANALYSIS REPORT  
TICTOC Rev. 0

Sampler: F-476

Date: 03-15-1990 Time: 06:34:09

Blank = .3711292 Sample Size = 200 Dilution Factor = 1.1  
% Difference = 10 Min Readings = 7 Max Readings = 7

Reading	Analysis Time	Coulometer	% Difference
1	1.01	0.00	0.00
2	2.01	1.50	100.00
3	3.01	2.50	34.78
4	4.01	2.80	17.86
5	5.01	3.30	15.15
6	6.01	3.60	9.33
7	7.01	3.90	7.69

$$(.3.9 - 2.600374) / (1.1) / (200) = 7.147947E-03 \text{ g/L Carbon}$$

$$(.3.9 - 2.600374) / (1.1) / (200) / (12) = 5.956622E-04 \text{ Molar Carbon}$$

Sample Run By: 80029

COULOMETER ANALYSIS REPORT  
TICTOC Rev. 0

Sampler: F-477

Date: 03-15-1990 Time: 06:42:34

Blank = .3711292 Sample Size = 200 Dilution Factor = 1.1  
% Difference = 10 Min Readings = 7 Max Readings = 7

==== Reading ===== Analysis Time ===== Coulometer ===== % Difference =====  
1 1.01 0.00 0.00

2 2.01 75.90 100.00

3 3.01 103.00 26.31

4 4.01 113.10 8.93

5 5.01 117.00 3.33

6 6.01 118.80 1.52

7 7.01 119.80 0.83

$$(119.8 - 2.600011) (1.1) / (200) = .6446 \text{ g/L Carbon}$$

$$(119.8 - 2.600011) (1.1) / (200)(12) = 5.371666E-02 \text{ Molar Carbon}$$

Sample Run By: 80028

COULOMETER ANALYSIS REPORT  
TICTOC Rev. 0

Sample: F-473

Date: 03-15-1990 Time: 06:56:54

Blank = .3711292 Sample Size = 200 Dilution Factor = 11  
% Difference = 10 Min Readings = 7 Max Readings = 7

====	Reading	Analysis Time	Coulometer	==== % Difference ===
1	1.01	0.00	0.00	
2	2.01	35.70	100.00	
3	3.01	44.70	20.13	
4	4.01	49.40	9.51	
5	5.01	52.30	5.54	
6	6.01	54.10	3.33	
7	7.01	55.30	2.17	

$$(.55.3 - 2.600374) / (11) / (200) = 2.898479 \text{ g/L Carbon}$$

$$(.55.3 - 2.600374) / (11) / (200) / (12) = .24154 \text{ Molar Carbon}$$

Sample Run By: 80028

## **ACID DIGESTION TEST ANALYSIS**

## ICP Results

## Data Summary

Date Analyzed:	March 31.1990	Acid Digested Standard	F0479
Procedure:	LA-505-151/A-0	Reagent Blank	F0487
Analyst:	J. A. White	Sample 89-072	F0480
Digestion	Acid Digestion	Duplicate of 89-072	F0481
Procedure:	LA-505-159/A-0	Spike of F0480	F0482
		Acid Digested Standard	F0483

	Instrument Starting LMCS Standard %	Acid Digest. LMCS Standard %	Reagent BLANK ppm	Wet Weight Sample ug/g	Wet Weight Sample ug/g	Duplicate ug/g	Spike Recovery %	LMCS ACID Digestion %	Closing LMCS Standard %
Aluminum	101.78%		0.17	36826	48263		NOT CALC.	88.04%	106.89%
Arsenic	104.53%		0.02 LT	165	63 LT				105.48%
Barium	96.48%		0.00 LT	78	51		135.89%	81.31%	99.54%
Beryllium	95.14%		0.00	5	3				98.55%
Bismuth	102.68%	100.08%	0.35	6354	5393		NOT CALC.		106.10%
Boron	98.70%	87.77%	0.16	968	66		-45.79%		101.92%
Cadmium	95.29%	90.21%	0.01	28	8 LT		40.63%		103.35%
Calcium	99.48%	91.28%	0.08	492	515		37.09%		102.80%
Cerium	95.82%		0.07 LT	1272	211 LT		-52.79%	77.25%	101.33%
Chromium	94.02%		0.00 LT	794	825		145.81%	78.74%	100.28%
Copper	97.48%	88.42%	0.01 LT	112	55 LT		24.07%		100.98%
Europium	97.82%		0.00 LT	21	4 LT				101.23%
Iron	97.36%		0.05	6842	8395		NOT CALC.	82.27%	102.65%
Lanthanum	93.19%	84.28%	0.09	129	36 LT		20.59%		96.47%
Lead	99.82%	97.96%	0.16	675	175		246.48%		103.03%
Lithium	97.10%		0.01	39	-1 LT		141.46%	81.06%	98.78%
Magnesium	98.54%	91.03%	0.02	1155	173		-42.04%		104.28%
Manganese	96.33%		0.02	5412	6982		NOT CALC.	81.24%	102.18%
Mercury	99.31%		0.02	1477	1374				96.81%
Molybdenum	100.25%	96.89%	0.01	58	22		48.19%		101.70%
Nickel	96.28%		0.02 LT	234	166		160.17%	80.69%	103.50%
Phosphorus	103.15%	94.46%	0.13	2159	1567		148.31%		94.76%
Potassium	97.96%	92.02%	0.12 LT	1560	86 LT		40.50%		102.77%
Samarium	100.65%		0.06 LT	1239	178 LT				103.81%
Selenium	100.93%		0.10	1188	703				102.21%
Silver	101.65%	72.18%	0.01 LT	98	23 LT		23.41%		104.62%
Sodium	96.97%	90.36%	0.27	43084	56657		NOT CALC.		99.99%
Strontium	98.01%	89.46%	0.00	526	656		45.91%		101.61%
Sulfur	99.04%		0.17	928	708				98.43%
Tantalum	94.15%		0.02 LT	256	56 LT		12.90%	79.69%	94.36%
Thallium	99.75%		0.08	5297	1093				103.48%
Thorium	103.25%		0.06	2829	185				106.80%
Tin	99.41%		0.06	141	69		181.10%	83.10%	108.40%
Titanium	98.09%		0.06	61	24		148.07%	82.46%	103.28%
Uranium	106.26%		0.27 LT	15299	8549				109.55%
Vanadium	96.43%		0.00 LT	100	52				100.11%
Zinc	95.88%	87.80%	0.13	104	56		35.82%		102.09%
Zirconium	98.54%		0.01 LT	260	129		187.34%	83.90%	103.64%

LT: Less Than

NC: Not Calibrated

NOT CALC: Not Calculated

# Instrument Standards Outside Control Limits

# Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	N/A
PROCEDURE/REV	LA-505-158/A-1
TECHNOLOGIST	J. White
DATE	March 07, 1990
TEMPERATURE	N/A
STARTING TIME	03-06-90
ENDING TIME	03-06-90
CHEMIST	S. A. Jones

## Acid Digestion

NOTE: Sample is not spiked prior to digestion. This procedure provides a sample to be spiked later with the appropriate element.

	DESCRIPTION	LAB ID
1	Reagent Blank	F0487
2	Sample 89-072	F0480
3	Duplicate Sample 89-072	F0481
4	Spike of sample 89-072	F0482
5		
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	DESCRIPTION	LAB ID
12		
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STANDARD TYPE	PRIMARY Book # & ALIQUOT VOL.	SECOND Book # & ALIQUOT VOL.	THIRD Bk# & ALQT.VOL.	FINAL Vol. OF STD.
N/A				
Spike	104C15B/5 mL	103C15D/5 mL		50 mL

## ICP Results

## Raw Data Summary

Date Analyzed:	March 31.1990	Acid Digested Standard	F0479					
Procedure:	LA-505-151/A-0	Reagent Blank	F0487					
Analyst:	J. A. White	Sample 89-072	F0480					
Digestion	Acid Digestion	Duplicate of 89-072	F0481					
Procedure:	LA-505-159/A-0	Spike of F0480	F0482					
		Acid Digested Standard	F0483					
Laboratory ID#	F0479							
Instrument	Acid Digest. LMCS Standard %	Reagent BLANK	Wet Weight Sample ug/g	Wet Weight Sample ug/g	Duplicate ug/g	Spike Recovery %	LMCS ACID Digestion %	Closing LMCS Standard %
Starting LMCS Standard %	Starting LMCS Standard %	ppm						
Aluminum	101.78%		0.17	36826	48263	NOT CALC.	88.04%	106.89%
Antimony	102.26%		0.24	974	444			110.63% #
Arsenic	104.53%		0.02 LT	165	63 LT			105.48%
Barium	96.48%		0.00 LT	78	51	135.89%	81.31%	99.54%
Beryllium	95.14%		0.00	5	3			98.55%
Bismuth	102.68%	100.08%	0.35	6354	5393	NOT CALC.		106.10%
Boron	98.70%	87.77%	0.16	968	66	-45.79%		101.92%
Cadmium	95.29%	90.21%	0.01	28	8 LT	40.63%		103.35%
Calcium	99.48%	91.28%	0.08	492	515	37.09%		102.80%
Cerium	95.82%		0.07 LT	1272	211 LT	-52.79%	77.25%	101.33%
Chromium	94.02%		0.00 LT	794	825	145.81%	78.74%	100.28%
Cobalt	85.78% #		0.04	493	29 LT	265.91%	69.56%	87.77% #
Copper	97.48%	88.42%	0.01 LT	112	55 LT	24.07%		100.98%
Europium	97.82%		0.00 LT	21	4 LT			101.23%
Iron	97.36%		0.05	6842	8395	NOT CALC.	82.27%	102.65%
Lanthanum	93.19%	84.28%	0.09	129	36 LT	20.59%		96.47%
Lead	99.82%	97.96%	0.16	675	175	246.48%		103.03%
Lithium	97.10%		0.01	39	-1 LT	141.46%	81.06%	98.78%
Magnesium	98.54%	91.03%	0.02	1155	173	-42.04%		104.28%
Manganese	96.33%		0.02	5412	6982	NOT CALC.	81.24%	102.18%
Mercury	99.31%		0.02	1477	1374			96.81%
Molybdenum	100.25%	96.89%	0.01	58	22	48.19%		101.70%
Neodymium	89.33% #		-0.09 LT	792	-195 LT	381.28%	74.65%	95.03%
Nickel	96.28%		0.02 LT	234	166	160.17%	80.69%	103.50%
Phosphorous	103.15%	94.46%	0.13	2159	1567	148.31%		94.76%
Potassium	97.96%	92.02%	0.12 LT	1560	86 LT	40.50%		102.77%
Samarium	100.65%		0.06 LT	1239	178 LT			103.81%
Selenium	100.93%		0.10	1188	703			102.21%
Silicon	82.30% #	56.97%	0.21	3791	2084	-186.81%		85.22% #
Silver	101.65%	72.18%	0.01 LT	98	23 LT	23.41%		104.62%
Sodium	96.97%	90.36%	0.27	43084	56657	NOT CALC.		99.99%
Strontium	98.01%	89.46%	0.00	526	656	45.91%		101.61%
Sulfur	99.04%		0.17	928	708			98.43%
Tantalum	94.15%		0.02 LT	256	56 LT	12.90%	79.69%	94.36%
Thallium	99.75%		0.08	5297	1093			103.48%
Thorium	103.25%		0.06	2829	185			106.80%
Tin	99.41%		0.06	141	69	181.10%	83.10%	108.40%
Titanium	98.09%		0.06	61	24	148.07%	82.46%	103.28%
Tungsten	84.26% #		0.04 LT	243	118			84.98% #
Uranium	106.26%		0.27 LT	15299	8549			109.55%
Vanadium	96.43%		0.00 LT	100	52			100.11%
Zinc	95.88%	87.80%	0.13	104	56	35.82%		102.09%
Zirconium	98.54%		0.01 LT	260	129	187.34%	83.90%	103.64%

LT: Less Than

NC: Not Calibrated

NOT CALC: Not Calculated

# Instrument Standards Outside Control Limits

# Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	ICP
PROCEDURE/REV	LA-505-151
TECHNOLOGIST	Janice A. White
DATE	March 31, 1990
TEMPERATURE	N/A
STARTING TIME	0748
ENDING TIME	1415
CHEMIST	S. A. Jones

ICP  
ICP Analysis of 89-072  
Sample analysis after Acid Digestion

	DESCRIPTION	LAB ID
1	LMCS Check Std.	N/A
2	Digested Std.	F0479
3	Reagent Blank	F0487
4	Sample 89-072	F0480
5	Duplicate Sample 89-072	F0481
6	Spike of Sample 89-072	F0482
7	Digested Std.	F0483
8	LMCS Check Std.	N/A
9	Sample Core Comp. 6	F0935
10	Duplicate Core Comp. 6	F0936
11	Sample Core Comp. 5	F0911

	DESCRIPTION	LAB ID
12	Duplicate Core Comp. 5	F0912
13	LMCS Check Std.	N/A
14	Sample 89-083	F0744
15	Duplicate Sample 89-083	F0745
16	Sample 89-084	F0768
17	Duplicate Sample 89-084	F0769
18	Acid Digest Std.	F0771
19	LMCS Check Std.	
20		
21		
22		

STANDARD TYPE	PRIMARY Book # & ALIQUOT VOL.	SECOND Book # & ALIQUOT VOL.	THIRD Bk# & ALQT.VOL.	FINAL VOL. OF STD.
LMCS Check Standard	78C11F/1.0 mL	82B38C/1.0 mL	77C11F/1.0 mL	11.00 mL
Digested LMCS (1)	81C11A/5.0 mL			50.00 mL
Digested LMCS (2)	82C11A/5.0 mL			50.00 mL
Spike	103C15C/5.0 mL	10415D/5.0 mL	89-072/.3935 g	50.00 mL

## ICP Raw Data

Page 1 of 4

Date Analyzed:	March 31.1990	Acid Digested Standard	F0479
Procedure:	LA-505-151/A-0	Reagent Blank	F0487
Analyst:	J. A. White	Sample 89-072	F0480
Digestion	Acid Digestion	Duplicate of 89-072	F0481
Procedure:	LA-505-159/A-0	Spike of F0480	F0482
		Acid Digested Standard	F0483

						Dilution Three	Dilution Three
			Starting LMCS Standard	LMCS Acid Digestion Standard	Acid Digestion Standard Recovery	Reagent Blank	Weight Volume Sample
			Instrument Standard	Recovery %	Recovery %	ppm	
			ppm	%	ppm	%	ppm
	SST-1	SST-2	SST-3				
Aluminum			50.89	101.78%			0.17
Antimony	10.23			102.26%			0.24
Arsenic			52.26	104.53%			0.02 LT
Barium	9.65			96.48%			0.00 LT
Beryllium			9.51	95.14%			0.00
Bismuth		51.44		102.68%	10.01	100.08%	0.35
Boron	9.87			98.70%	8.78	87.77%	0.16
Cadmium	9.53			95.29%	9.02	90.21%	0.01
Calcium	9.95			99.48%	9.13	91.28%	0.08
Cerium	9.58			95.82%			0.07 LT
Chromium	9.40			94.02%			0.00 LT
Cobalt	8.58			85.78% #			0.04
Copper	9.75			97.48%	8.84	88.42%	0.01 LT
Europium		9.78		97.82%			0.00 LT
Iron	9.74			97.36%			0.05
Lanthanum		46.69		93.19%	8.43	84.28%	0.09
Lead		50.01		99.82%	9.80	97.96%	0.16
Lithium	9.71			97.10%			0.01
Magnesium	9.85			98.54%	9.10	91.03%	0.02
Manganese	9.63			96.33%			0.02
Mercury		24.83		99.31%			0.02
Molybdenum		50.13		100.25%	9.69	96.89%	0.01
Neodymium	8.93			89.33% #			-0.09 LT
Nickel	9.63			96.28%			0.02 LT
Phosphorous		51.57		103.15%	9.45	94.46%	0.13
Potassium	24.49			97.96%	9.20	92.02%	0.12 LT
Samarium		10.07		100.65%			0.06 LT
Selenium		50.46		100.93%			0.10
Silicon		41.15		82.30% #	5.70	56.97%	0.21
Silver		10.17		101.65%	7.22	72.18%	0.01 LT
Sodium	24.24			96.97%	9.04	90.36%	0.27
Strontium	9.80			98.01%	8.95	89.46%	0.00
Sulfur		49.52		99.04%			0.17
Tantalum		47.08		94.15%			0.02 LT
Thallium		49.88		99.75%			0.08
Thorium		51.73		103.25%			0.06
Tin	49.70			99.41%			0.06
Titanium		49.05		98.09%			0.06
Tungsten		21.07		84.26% #			0.04 LT
Uranium		53.24		106.26%			0.27 LT
Vanadium		9.64		96.43%			0.00 LT
Zinc	9.59			95.88%	8.78	87.80%	0.13
Zirconium		49.27		98.54%			0.01 LT
Dilution Factor	1.00	1.00	1.00		10.00	1.00	1.00

## ICP Raw Data

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	0.00964 g/mL			0.00788 g/mL			0.00787 g/mL		
	Sample	Sample	Digestion Weight	Sample	Sample	Digestion Weight	Sample	Sample	Digestion Weight
	Dilution	Dilution	Duplicate Dilution	Duplicate Dilution	Duplicate Dilution	Dilution	Dilution	Dilution	Dilution
	Two ppm	One ppm	Three ppm	Two ppm	One ppm	Three ppm	Two ppm	One ppm	
Aluminum	355.00	485.38		380.31	361.71		421.18	366.06	
Antimony	24.03	9.39		23.55	3.50		39.89	4.20	
Arsenic	3.99	1.59		2.90	0.50 LT		5.81	1.03	
Barium	1.83	0.75		0.68	0.40		14.20	11.84	
Beryllium	0.14	0.05		0.10	0.02		0.18	0.02	
Bismuth	64.27	61.25		56.94	42.50		78.01	40.75	
Boron	9.33	1.27		2.84	0.52		5.87	3.04	
Cadmium	0.84	0.27		0.35	0.06 LT		4.28	2.84	
Calcium	4.74	4.41		4.06	3.42		7.58	6.54	
Cerium	35.82	12.26		14.76	1.66 LT		58.97	4.73	
Chromium	7.65	10.03		6.50	7.26		20.83	17.25	
Cobalt	10.88	4.75		9.80	0.23 LT		30.47	10.41	
Copper	2.76	1.08		1.28	0.43 LT		6.50	3.29	
Europium	0.59	0.21		0.24	0.03 LT		0.91	0.06 LT	
Iron	65.96	87.62		66.15	63.41		76.17	65.20	
Lanthanum	2.36	1.25		1.36	0.28 LT		7.71	3.08	
Lead	11.32	6.51		15.98	1.38		29.96	6.65	
Lithium	1.14	0.37		0.29	-0.01 LT		14.45	11.83	
Magnesium	11.14	1.61		1.36	1.17		4.89	4.13	
Manganese	52.17	69.98		55.02	53.07		68.16	58.65	
Mercury	14.24	3.60		10.83	1.70		5.97	0.51	
Molybdenum	1.27	0.56		0.68	0.17		5.27	2.98	
Neodymium	17.92	7.63		-4.33	-1.54 LT		42.04	44.36	
Nickel	3.58	2.26		2.73	1.31		17.86	12.36	
Phosphorous	21.71	20.81		21.18	12.35		31.82	16.00	
Potassium	44.64	15.03		12.45	0.68 LT		69.67	4.05 LT	
Samarium	35.42	11.94		13.51	1.40 LT		54.36	1.59 LT	
Selenium	20.48	11.45		11.28	5.54		32.07	10.02	
Silicon	36.55	19.06		24.14	16.42		26.16	11.16	
Silver	2.59	0.95		1.04	0.18 LT		7.19	3.12	
Sodium	415.33	540.11		446.46	432.63		448.44	388.06	
Strontium	5.07	6.36		5.17	4.90		8.73	7.37	
Sulfur	9.48	8.95		8.24	5.58		11.00	5.67	
Tantalum	7.44	2.47		3.26	0.44 LT		13.21	3.30	
Thallium	51.06	21.98		29.86	8.61		69.83	8.51	
Thorium	27.27	9.14		11.66	1.46		40.73	1.90	
Tin	3.67	1.36		1.71	0.54		19.22	12.28	
Titanium	1.52	0.59		0.76	0.19		15.29	12.09	
Tungsten	6.21	2.34		3.55	0.93		8.15	0.86	
Uranium	266.22	147.48		142.49	67.37		392.78	68.61	
Vanadium	2.15	0.96		1.25	0.41		2.76	0.37 LT	
Zinc	1.17	1.00		0.77	0.44		4.40	3.27	
Zirconium	5.12	2.50		2.54	1.02		20.74	12.72	
Dilution Factor	101.00	21.00	1.00	101.00	21.00	1.00	101.00	21.00	

## ICP Raw Data

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	Spike Recovery	Standard LMCS Acid Digestion	Acid Digestion Standard Recovery		Ending LMCS Standard	Standard Recovery
	%	ppm	%	SST-1	SST-2	SST-3
Aluminum	NOT CALC.	8.80	88.04%		53.44	106.89%
Antimony				11.06		110.63% #
Arsenic					52.74	105.48%
Barium	135.89%	8.13	81.31%	9.95		99.54%
Beryllium					9.86	98.55%
Bismuth	NOT CALC.				53.16	106.10%
Boron	-45.79%			10.19		101.92%
Cadmium	40.63%			10.34		103.35%
Calcium	37.09%			10.28		102.80%
Cerium	-52.79%	7.73	77.25%	10.13		101.33%
Chromium	145.81%	7.87	78.74%	10.03		100.28%
Cobalt	265.91%	6.96	69.56%	8.78		87.77% #
Copper	24.07%			10.10		100.98%
Europium					10.12	101.23%
Iron	NOT CALC.	8.23	82.27%	10.27		102.65%
Lanthanum	20.59%				48.33	96.47%
Lead	246.48%				51.62	103.03%
Lithium	141.46%	8.11	81.06%	9.88		98.78%
Magnesium	-42.04%			10.43		104.28%
Manganese	NOT CALC.	8.12	81.24%	10.22		102.18%
Mercury					24.20	96.81%
Molybdenum	48.19%				50.85	101.70%
Neodymium	381.28%	7.47	74.65%	9.50		95.03%
Nickel	160.17%	8.07	80.69%	10.35		103.50%
Phosphorous	148.31%				47.38	94.76%
Potassium	40.50%			25.69		102.77%
Samarium					10.38	103.81%
Selenium		3.27			51.11	102.21%
Silicon	-186.81%				42.61	85.22% #
Silver	23.41%			10.46		104.62%
Sodium	NOT CALC.			25.00		99.99%
Strontium	45.91%			10.16		101.61%
Sulfur					49.21	98.43%
Tantalum	12.90%	7.93	79.69%		47.18	94.36%
Thallium					51.74	103.48%
Thorium					53.51	106.80%
Tin	181.10%	8.31	83.10%	54.20		108.40%
Titanium	148.07%	8.25	82.46%		51.64	103.28%
Tungsten					21.25	84.98% #
Uranium		5.42			54.89	109.55%
Vanadium					10.01	100.11%
Zinc	35.82%			10.21		102.09%
Zirconium	187.34%	8.37	83.90%		51.82	103.64%
Dilution Factor		10.00		1.00	1.00	1.00

## ICP Raw Data

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	Spike Standard	Spike Standard		LMCS Standards	LMCS Standard	ACID DIGESTION	ACID DIGEST.
	LMCS	ID		Values	IDs	LMCS STANDARD	DIGEST. LMCS
	ppm added	#		ppm	#	ppm in Sample	IDs Book
				SST-1	SST-2	SST-3	
Aluminum	10.00	5.0 mL				78C11F	
Antimony		104C15D		10.00		82B38C	
Arsenic		+				77C11F	
Barium	10.00			10.00			100.00
Beryllium						10.00	100.00
Bismuth	10.00				50.10		100.00
Boron	10.00			10.00			100.00
Cadmium	10.00			10.00			100.00
Calcium	10.00			10.00			100.00
Cerium	10.00			10.00			100.00
Chromium	10.00			10.00			100.90
Cobalt	10.00			10.00			100.00
Copper	10.00			10.00			100.00
Europium					10.00		
Iron	10.00			10.00			100.00
Lanthanum	10.00				50.10		100.00
Lead	10.00				50.10		100.00
Lithium	10.00			10.00			100.00
Magnesium	10.00			10.00			100.00
Manganese	10.00			10.00			100.00
Mercury					25.00		
Molybdenum	10.00				50.00		99.80
Neodymium	10.00			10.00			100.00
Nickel	10.00			10.00			100.00
Phosphorous	10.00				50.00		100.00
Potassium	10.00			25.00			100.00
Samarium					10.00		
Selenium					50.00		
Silicon	10.00				50.00		100.00
Silver	10.00				10.00		
Sodium	10.00			25.00			100.00
Strontium	10.00			10.00			100.00
Sulfur					50.00		
Tantalum	9.95				50.00		99.50
Thallium					50.00		
Thorium					50.10		
Tin	10.00			50.00			100.00
Titanium	10.00				50.00		100.10
Tungsten					25.00		
Uranium					50.10		
Vanadium					10.00		
Zinc	10.00			10.00			100.00
Zirconium	9.98				50.00		99.80
Dilution Factor							10.00

## ICP Calibration Report

Procedure: LA-505-151                  Revision: A-0  
Instrument: WB39939  
Technologist: J. A. White  
Date: March 31, 1990

### Calibration Standards for ICP Program "SST"

Element	Standard	Element	Standard
Aluminum	SST-3	Antimony	SST-4
Arsenic	SST-4	Barium	SST-2
Beryllium	SST-2	Bismuth	SST-4
Boron	SST-3	Cadmium	SST-2
Calcium	SST-2	Cerium	SST-5
Chromium	SST-2	Cobalt	SST-2
Copper	SST-2	Europium	SST-5
Iron	SST-2	Lanthanum	SST-5
Lead	SST-4	Lithium	SST-1
Magnesium	SST-2	Manganese	SST-2
Mercury	SST-3	Molybdenum	SST-3
Neodymium	SST-5	Nickel	SST-2
Phosphorous	SST-3	Potassium	SST-1
Samarium	SST-5	Selenium	SST-4
Silicon	SST-3	Silver	SST-2
Sodium	SST-1	Strontium	SST-2
Sulfur	SST-3	Tantalum	SST-3
Thallium	SST-4	Thorium	SST-4
Tin	SST-4	Titanium	SST-3
Tungsten	SST-3	Uranium	SST-4
Vanadium	SST-2	Zinc	SST-2
Zirconium	SST-3		

### ICP Standard Formulations

#### SST-0:

Calibration blank, 1 M ultrex HNO<sub>3</sub>.

#### SST-1:

Stock solutions from AESAR/John Mathey Inc., Seabrook, NH 03874.  
Individual element solutions as follows:

Li LiCO<sub>3</sub> 10,000 ppm in 5% HNO<sub>3</sub> Lot# 14394A  
K KNO<sub>3</sub> 10,000 ppm in 5% HNO<sub>3</sub> Lot# 14379A

Na NaCO<sub>3</sub> 10,000 ppm in 5% HNO<sub>3</sub> Lot# 14400A

200 mL of standard made by combining 25 mL HCl/HNO<sub>3</sub> mixed acid, 1 mL each single element standards, and water.

SST-2:

Stock solutions from VHG labs, Inc., 180 Zachary Rd. #5, Manchester, NH 03103. Mixed element standards as follows:

SM-10 Li, Na, K, Rb, Cs, Be, Mg, Ca, Sr, & Ba 100 ppm  
Lot# 0-119A

SM-20 V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ag, & Cd 100 ppm  
Lot# 0-119B

50 mL of each mixed standard are added to a 250 mL volumetric flask and diluted to volume with 1 M HNO<sub>3</sub>.

SST-3:

Stock solutions from AESAR/John Mathey Inc., Seabrook, NH 03874. Individual element solutions as follows:

Al Al 10,000 ppm in 10% HCl Lot# 9-053A  
B H<sub>3</sub>BO<sub>3</sub> 10,000 ppm in 1% NH<sub>4</sub>OH Lot# 9-335A  
Hg Hg 10,000 ppm in 5% HNO<sub>3</sub> Lot# 8-656S  
Mo Mo 10,000 ppm in 5% HCl Lot# 9-159T  
P P 10,000 ppm in 5% HNO<sub>3</sub> Lot# 9-160A  
Si Si 1000 ppm in KOH Lot# 086DM Spex Industries, Edison, NJ  
S (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> in H<sub>2</sub>O Lot# 9-231M  
Ta TaCl<sub>5</sub> 10,000 ppm in 5% HCl/tr HF Lot# 9-335M  
Ti Ti 10,000 ppm in 5% HF Lot# 9-079EE  
W W 10,000 ppm in 5% HF/tr HNO<sub>3</sub> Lot# 8-685L  
Zr ZrCl<sub>2</sub>O 10,100 ppm in 5% HCl Lot# 9-078G

50 mL of each mixed standard are added to a 250 mL volumetric flask and diluted to volume with 1 M HNO<sub>3</sub>.

SST-4:

Stock solution from VHG labs, Inc., 180 Zachary Rd. #5, Manchester, NH 03103. Mixed element standard as follows:

SM-50 Ga, In, Tl, Ge, Sn, Pb, As, Sb, Bi, Se, Te, Th, & U 100 ppm Lot# 0-119D

Solution is used directly for calibration.

SST-5:

Stock solution from VHG labs, Inc., 180 Zachary Rd. #5, Manchester, NH 03103. Mixed element standard as follows:

SM-60 Sc, Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, & Lu 100 ppm Lot# 7-165F

50 mL of SM-60 is added to a 250 mL volumetric flask and diluted to volume with 1 M HNO<sub>3</sub>.

31-Mar-90 07:48:34

Condition	Value	Min	/	Max
VACUUM	= 37.21	7.000	/	50.00
SPITEMP	= 38.60	37.00	/	39.00
MAINS	= 233.2	220.0	/	247.0
-1000V	= -1005	-1010	/	-990
CTEMP	= 24.20	19.00	/	35.00
+5V	= 5.160	4.750	/	5.250
+12V	= 12.15	11.70	/	12.30
-12V	= -12.2	-12.3	/	-11.7
+24V	= 23.16	22.50	/	26.50
-100V	= -100	-101	/	-99.0
+5VSQ	= 5.150	4.750	/	5.250
+15VSQ	= 15.14	14.70	/	15.30
-15VSQ	= -15.2	-15.3	/	-14.7

Position Calibration in Progress

SLIT	PM	ALPHA	BETA	ALPHA	BETA	ALPHA	BETA
POS'N		SLIT	SLIT	LAMBDA1	LAMBDA1	LAMBDA2	LAMBDA2

Previous data :

INSTR 0.00000 587.348 1.00106 -0.6934 1.00008 -0.0604 0.00000 0.00000

Current data :

INSTR 0.00000 587.206 1.00105 -0.6533 1.00009 -0.0613 0.00000 0.00000

START THE PLASMA NOW, PLEASE. 31-Mar-90 07:56:28

Sample name : SST0  
Programme : SST 31-Mar-90 08:31:46

NAME	MV	INT	RSD
AL	1.27	1.34	
SB	0.34	1.04	
AS	0.76	1.42	
BA	2.12	1.06	
BE	0.52	0.29	
BI	2.76	1.84	
B	2.67	1.44	
CU	1.66	1.67	
CA	0.36	1.12	
CE	2.96	1.21	
CR	0.93	5.89	
CO	0.19	0.60	
CU	1.82	1.03	
EU	2.27	1.13	
FE	1.05	0.53	
LA	0.28	1.07	
PB	0.24	0.24	
LI	2.32	1.24	
HG	0.32	0.91	
HN	0.58	1.89	
HG	2.94	0.14	
HO	1.30	0.12	
ND	3.21	1.97	
NI	2.41	1.25	
P	0.79	2.31	
K	1.98	0.99	
SM	2.81	1.19	
SE	1.23	1.50	
SI	2.03	1.09	
AG	8.13	1.28	
NA	2.95	1.37	
SR	2.31	0.87	
S	0.54	1.42	
TA	2.26	0.91	
TL	2.37	0.49	
TH	0.69	0.96	
SN	0.93	0.54	
TI	2.28	0.98	
W	0.97	1.89	
U	2.80	1.20	
V1	2.69	1.00	
ZN	2.06	0.71	
ZR	3.11	0.78	

Sample name : SST1  
Programme : SST 31-Mar-90 08:36:20

NAME	MV	INT	RSD
LI	649.65	0.82	
K	15.37	0.45	
NA	75.00	0.49	

Sample name : SST2  
Programme : SST 31-Mar-90 08:38:24

NAME	MV	INT	RSD
BA	398.40	0.46	
BE	618.01	0.42	
CD	343.84	1.26	
CA	575.15	0.46	
CR	79.83	3.81	
CO	1.43	1.88	
CU	131.69	0.46	
FE	166.89	1.17	
HG	514.80	1.06	
MN	350.10	0.78	
NI	194.74	1.10	
AG	559.91	0.50	
SK	697.07	0.66	
VI	237.54	0.48	
ZN	669.67	0.89	

Sample name : SST3  
 Programme : SST                            31-Mar-90 08:41:31

NAME	MV	INT	RSD
AL	25.08	1.54	
B	867.34	1.93	
HO	703.22	2.73	
HO	325.72	2.49	
P	55.38	2.45	
SI	95.90	2.50	
S	42.64	2.41	
TA	131.18	2.66	
TI	592.48	1.71	
W	74.93	2.41	
ZK	190.94	1.72	

Sample name : SST4  
 Programme : SST                            31-Mar-90 08:44:53

NAME	MV	INT	RSD
SB	7.34	0.19	
AS	136.47	0.63	
DI	116.23	0.63	
PB	5.29	0.79	
SE	54.98	1.16	
TL	54.92	0.81	
TH	19.46	0.27	
SN	230.98	0.98	
U	13.57	0.08	

Sample name : SST5  
 Programme : SST                            31-Mar-90 08:48:47

NAME	MV	INT	RSD
CE	16.52	0.51	
EU	654.69	0.67	
LA	7.71	0.57	
ND	18.61	0.32	

SM 15.72 0.52

Programme name : SST Channel name : AL Polynomial type : CC

Curve	Min Int	Max Int	C0	C1	C2	C3
CRV1	1.2081	26.334	-0.267060E+01	0.210008E+01		

Programme name : SST Channel name : SBL Polynomial type : CC

Curve	Min Int	Max Int	C0	C1	C2	C3
CRV1	0.3217	7.7112	-0.483441E+01	0.142748E+02		

Programme name : SST Channel name : AS Polynomial type : CC

Curve	Min Int	Max Int	C0	C1	C2	C3
CRV1	0.7220	143.29	-0.560038E+00	0.736892E+00		

Programme name : SST Channel name : RA Polynomial type : CC

Curve	Min Int	Max Int	C0	C1	C2	C3
CRV1	2.0184	418.32	-0.107232E+00	0.504699E-01		

Programme name : SST Channel name : BE1 Polynomial type : CC

Curve	Min Int	Max Int	C0	C1	C2	C3
CRV1	0.4975	648.91	-0.169612E-01	0.323893E-01		

Programme name : SST Channel name : BI Polynomial type : CC

Curve	Min Int	Max Int	C0	C1	C2	C3
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CRV1 2.6217 122.04 -0.243213E+01 0.881913E+00

Programme name : SST Channel name : B Polynomial type : CC

Curve Min Int Max Int C0 Curve Coefficients C1 C2 C3

CRV1 2.5403 910.71 -0.154626E+00 0.578258E-01

Programme name : SST Channel name : CD Polynomial type : CC

Curve Min Int Max Int C0 Curve Coefficients C1 C2 C3

CRV1 1.5770 361.03 -0.970258E-01 0.584493E-01

Programme name : SST Channel name : CA Polynomial type : CC

Curve Min Int Max Int C0 Curve Coefficients C1 C2 C3

CRV1 0.3442 603.91 -0.126076E-01 0.347956E-01

Programme name : SST Channel name : CE Polynomial type : CC

Curve Min Int Max Int C0 Curve Coefficients C1 C2 C3

CRV1 2.8164 17.344 -0.437482E+01 0.147565E+01

Programme name : SSI Channel name : CR Polynomial type : CC

Curve Min Int Max Int C0 Curve Coefficients C1 C2 C3

CRV1 0.8826 83.827 -0.235470E+00 0.253466E+00

Programme name : SST Channel name : CO Polynomial type : CC

CRV1 0.1821 1.5005 -0.309806E+01 0.161638E+02

Programme name : SST Channel name : CU Polynomial type : CC

Curve	Min Int Max Int		Curve Coefficients		
		C0	C1	C2	C3
CRV1	1.7293 138.27	-0.280337E+00	0.154003E+00		

Programme name : SST Channel name : EU Polynomial type : CC

Curve	Min Int Max Int		Curve Coefficients		
		C0	C1	C2	C3
CRV1	2.1575 687.43	-0.696175E-01	0.306550E-01		

Programme name : SST Channel name : FE Polynomial type : CC

Curve	Min Int Max Int		Curve Coefficients		
		C0	C1	C2	C3
CRV1	0.9937 175.23	-0.126143E+00	0.120596E+00		

Programme name : SST Channel name : LA Polynomial type : CC

Curve	Min Int Max Int		Curve Coefficients		
		C0	C1	C2	C3
CRV1	0.2701 8.0906	-0.766294E+00	0.269505E+01		

Programme name : SST Channel name : PB Polynomial type : CC

Curve	Min Int Max Int		Curve Coefficients		
		C0	C1	C2	C3
CRV1	0.2255 5.5584	-0.469378E+01	0.197772E+02		

Programme name : SST Channel name : LI Polynomial type : CC

Curve	Min Int Max Int		Curve Coefficients		
		C0	C1	C2	C3

CRV1 2.2011 682.13 -0.178964E+00 0.772397E-01

Programme name : SST Channel name : MG Polynomial type : CC

Curve	Min Int	Max Int	C0	Curve Coefficients	C1	C2	C3
CRV1	0.3005	540.54	-0.122972E-01	0.388743E-01			

Programme name : SST Channel name : MN Polynomial type : CC

Curve	Min Int	Max Int	C0	Curve Coefficients	C1	C2	C3
CRV1	0.3542	367.60	-0.333797E-01	0.572223E-01			

Programme name : SST Channel name : HG Polynomial type : CC

Curve	Min Int	Max Int	C0	Curve Coefficients	C1	C2	C3
CRV1	2.7886	738.38	-0.209582E+00	0.713996E-01			

Programme name : SST Channel name : MO Polynomial type : CC

Curve	Min Int	Max Int	C0	Curve Coefficients	C1	C2	C3
CRV1	1.2385	342.00	-0.200928E+00	0.154125E+00			

Programme name : SST Channel name : ND Polynomial type : CC

Curve	Min Int	Max Int	C0	Curve Coefficients	C1	C2	C3
CRV1	3.0466	19.544	-0.416322E+01	0.129817E+01			

Programme name : SST Channel name : NI Polynomial type : CC

Curve	Min Int	Max Int	C0	Curve Coefficients	C1	C2	C3
CRV1	0.0000	0.0000					

Programme name : SST Channel name : P Polynomial type : CC

Curve	Min	Int	Max	Int	Coefficients	C0	C1	C2	C3
CRV1	0.7480	58.149	-0.721094E+00	0.915860E+00					

Programme name : SST Channel name : K Polynomial type : CC

Curve	Min	Int	Max	Int	Coefficients	C0	C1	C2	C3
CRV1	1.8845	16.139	-0.740930E+01	0.373515E+01					

Programme name : SST Channel name : SM Polynomial type : CC

Curve	Min	Int	Max	Int	Coefficients	C0	C1	C2	C3
CRV1	2.6723	16.507	-0.435854E+01	0.154943E+01					

Programme name : SST Channel name : SE Polynomial type : CC

Curve	Min	Int	Max	Int	Coefficients	C0	C1	C2	C3
CRV1	1.1682	57.724	-0.228795E+01	0.186063E+01					

Programme name : SST Channel name : SI Polynomial type : CC

Curve	Min	Int	Max	Int	Coefficients	C0	C1	C2	C3
CRV1	1.9241	100.69	-0.107879E+01	0.532650E+00					

Programme name : SST Channel name : AG Polynomial type : CC

Curve	Min	Int	Max	Int	Coefficients	C0	C1	C2	C3
CRV1	7.7257	587.91	-0.294766E+00	0.362462E-01					

CRV1 7.7257 587.91 -0.294766E+00 0.362462E-01

Programme name : SST Channel name : NA Polynomial type : CC

Curve Min Int Max Int C0 Curve Coefficients C1 C2 C3

CRV1 2.8073 78.746 -0.205090E+01 0.694043E+00

Programme name : SST Channel name : SR Polynomial type : CC

Curve Min Int Max Int C0 Curve Coefficients C1 C2 C3

CRV1 2.1970 731.93 -0.665745E-01 0.287869E-01

Programme name : SST Channel name : S Polynomial type : CC

Curve Min Int Max Int C0 Curve Coefficients C1 C2 C3

CRV1 0.5114 44.770 -0.639361E+00 0.118767E+01

Programme name : SST Channel name : TA Polynomial type : CC

Curve Min Int Max Int C0 Curve Coefficients C1 C2 C3

CRV1 2.1451 137.74 -0.875728E+00 0.387833E+00

Programme name : SST Channel name : TL2 Polynomial type : CC

Curve Min Int Max Int C0 Curve Coefficients C1 C2 C3

CRV1 2.2490 57.661 -0.450506E+01 0.190301E+01

Programme name : SST Channel name : TH Polynomial type : CC

Curve Min Int Max Int C0 Curve Coefficients C1 C2 C3

CRV1 0.6596 20.432 -0.370028E+01 F482  
 Both Dif

Programme name : SST	Channel name :	Polynomial type : CC
Curve	Min Int Max Int	Curve Coefficients
	C0 C1 C2 C3	
CRV1	0.8879 242.52 -0.406305E+00 0.434706E+00	
Programme name : SST	Channel name : TI	Polynomial type : CC
Curve	Min Int Max Int	Curve Coefficients
	C0 C1 C2 C3	
CRV1	2.1666 622.10 -0.193213E+00 0.847176E-01	
Programme name : SST	Channel name : W	Polynomial type : CC
Curve	Min Int Max Int	Curve Coefficients
	C0 C1 C2 C3	
CRV1	0.9240 78.673 -0.657616E+00 0.676096E+00	
Programme name : SST	Channel name : U	Polynomial type : CC
Curve	Min Int Max Int	Curve Coefficients
	C0 C1 C2 C3	
CRV1	2.6568 14.250 -0.259567E+02 0.928132E+01	
Programme name : SST	Channel name : V1	Polynomial type : CC
Curve	Min Int Max Int	Curve Coefficients
	C0 C1 C2 C3	
CRV1	2.5514 249.41 -0.228713E+00 0.851605E-01	
Programme name : SST	Channel name : ZN	Polynomial type : CC
Curve	Min Int Max Int	Curve Coefficients
	C0 C1 C2 C3	

CRV1 1.9545 703.16 -0.616323E-01 0.299574E-01

Programme name : SST Channel name : ZR Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients		
			C0	C1	C2
CRV1	2.9580	200.48	-0.828879E+00	0.266207E+00	

Nitric Acid Blank

Sample name	:	HN03
Programme	:	SST

31-Mar-90 09:02:23

NAME	MV	INT	CONCEN	RSD
Al	1.44	0.358	6.32	
Si	0.37	0.400	16.88	
As	0.85	0.065	14.89	
Ca	2.45	0.017	8.90	
Be	0.59	0.002	7.62	
Bi	3.15	0.341	9.87	
P	3.65	0.056	7.96	
Cd	1.87	0.013	6.67	
Ca	0.39	0.001	12.69	
Co	3.43	0.692	9.55	
Cr	0.96	0.008	41.21	
Co	0.20	0.210	11.75	
Cu	2.07	0.039	8.09	
Tu	2.63	0.011	10.43	
Fe	1.17	0.015	13.98	
La	0.30	0.055	7.51	
Pb	0.25	0.303	7.53	
Li	2.63	0.024	9.36	
Hg	0.34	0.001	9.92	
Mn	0.64	0.003	1.04	
Hg	4.40	0.105	11.77	
Mo	1.45	0.023	7.19	
Nd	3.50	0.483	12.56	
Ni	2.76	0.039	10.09	
P	0.93	0.131	13.35	
K	2.22	0.072	7.44	
Sm	3.26	0.085	9.49	
Se	1.38	0.280	9.85	
Si	2.30	0.146	8.86	
Ag	9.47	0.048	8.92	
Na	3.39	0.300	9.87	
Sr	2.59	0.008	8.68	
S	0.39	0.063	9.62	
Ta	2.59	0.129	13.45	
Tl	2.26	0.742	20.40	
Th	0.29	0.489	9.51	
Sn	1.04	0.046	9.40	
Ti	2.57	0.025	8.12	
W	1.12	0.098	7.69	
U	3.24	4.096	9.36	
V	3.03	0.029	16.60	
Zn	2.31	0.007	2.91	
Zr	3.42	0.082	7.94	

## LMCS Check Standard #78C11F

Sample name : 78C11F  
 Sample code 1 : SST1  
 Programme : SST                    31-Mar-90 09:07:01

NAME	MV	INT	CONCEN	RSU
Al		1.46	0.390	2.42
Sb		1.06	10.226	0.14
As		0.93	0.128	6.97
Br		193.29	9.648	1.71
Be		0.58	0.002	12.30
Bi		3.24	0.420	13.55
B		173.42	9.873	1.32
Cd		164.69	9.529	1.02
Ca		286.26	9.948	1.59
Ce		9.46	9.582	1.00
Cr		38.02	9.402	0.84
Co		0.72	8.578	0.58
Cu		65.12	9.748	1.50
Eu		3.26	0.030	3.72
Fe		81.78	9.736	1.04
La		0.32	0.097	1.60
Pb		0.25	0.323	14.14
Li		128.03	9.710	1.76
Hg		253.01	9.854	1.13
Mn		168.93	9.633	0.97
Hg		3.41	0.034	29.24
Mo		1.48	0.027	17.73
Nd		10.09	8.933	0.47
Ni		90.19	9.628	0.78
P		0.96	0.155	2.39
K		8.54	24.491	1.01
Sm		3.02	0.325	25.14
Se		3.36	3.971	1.47
Si		2.27	0.130	13.41
Ag		8.91	0.028	20.14
Na		37.88	24.243	1.53
Sr		342.78	9.801	1.20
S		0.77	0.277	1.93
Ta		3.49	0.091	12.09
Tl		2.75	0.719	15.08
Th		0.79	0.517	7.87
Sn		115.27	49.704	0.98
Tl		2.45	0.014	18.19
W		1.32	0.235	2.67
U		3.43	5.869	7.57
V		2.90	0.018	12.28
Zn		322.13	9.588	0.94
Zr		3.32	0.055	16.97

## LMCS Check Standard #82B38C

Sample name : 82B38C  
 Sample code 1 : SST2  
 Programme : SST                            31-Mar-90 09:11:44

NAME	MV	INT	CONCEN	RSD
A1	3.31	4.282	0.99	
Sb	0.38	0.600	11.25	
As	2.56	1.325	1.56	
Ba	2.56	0.022	8.01	
Be	0.57	0.002	9.89	
Bi	61.13	51.442	0.28	
Br	6.26	0.208	15.86	
Cd	1.89	0.013	12.22	
Ca	0.93	0.020	0.10	
Ce	3.48	0.765	9.65	
Cr	1.28	0.089	3.41	
Co	0.19	0.022	75.00	
Cu	3.32	0.231	2.17	
Eu	321.38	9.782	0.89	
Fe	1.54	0.060	6.99	
La	17.61	146.687	0.52	
Pb	2.77	50.010	0.87	
Li	2.43	0.009	22.62	
Mg	0.55	0.009	1.78	
Mn	0.78	0.011	5.34	
Hg	3.65	0.051	25.91	
Mo	1.46	0.024	8.83	
Nd	3.87	0.863	9.37	
Ni	2.79	0.043	10.27	
P	1.17	0.350	4.61	
K	2.03	0.174	61.56	
Sm	9.31	10.065	0.41	
Se	1.45	0.401	5.87	
Si	3.20	0.626	2.77	
Aq	288.58	10.165	0.46	
Na	3.13	0.124	30.21	
Sr	2.65	0.010	9.36	
S	0.68	0.164	10.17	
Ta	2.83	0.221	6.17	
Tl	5.58	6.106	0.30	
Th	10.40	51.728	0.46	
Sn	1.17	0.101	1.32	
Ti	2.94	0.056	5.62	
W	1.06	0.060	41.82	
U	8.53	53.235	0.28	
V	5.54	0.243	0.61	
Zn	2.52	0.014	9.47	
Zr	3.67	0.149	6.42	

## LMCS Check Standard #77C11F

Sample name : 77C11F Sample code 1 : SST3 Programme : SSI				31-Mar-90 09:16:32
NAME	MV	INI	CONCEN	RSD
Al	25.50	50.890	0.20	
Sb	0.45	1.575	8.65	
As	71.68	52.264	1.43	
Ba	2.75	0.031	7.74	
Be	294.27	9.514	0.53	
Bi	4.34	1.301	1.27	
R	5.57	0.167	5.91	
Cd	2.12	0.030	1.61	
Ca	0.94	0.020	0.56	
Co	3.43	0.687	14.95	
Cr	1.12	0.048	9.12	
Co	0.21	0.242	20.37	
Cu	2.37	0.084	7.14	
Eu	2.66	0.012	13.85	
Fe	1.54	0.059	5.61	
La	0.30	0.049	22.71	
Pb	0.26	0.488	8.11	
Li	2.62	0.023	18.58	
Mg	0.48	0.006	2.18	
Mn	0.92	0.019	3.88	
Hg	350.66	24.827	1.51	
Mo	326.53	50.126	0.66	
Nd	3.58	0.485	11.90	
Ni	6.98	0.501	2.64	
P	57.10	51.574	1.58	
K	2.21	0.829	13.37	
Sm	3.29	0.736	14.22	
Se	28.35	50.463	1.05	
Si	79.28	41.148	1.10	
Ag	17.64	0.345	2.35	
Na	3.61	0.453	9.52	
Sr	2.68	0.011	11.35	
S	42.23	49.519	1.03	
Ta	123.64	47.075	1.01	
Tl	28.58	49.876	0.57	
Th	0.94	1.318	6.57	
Sn	1.57	0.224	1.75	
Ti	581.23	49.046	0.25	
W	32.13	21.066	1.27	
U	4.65	17.177	4.76	
V	115.91	9.643	0.95	
Zn	3.61	0.047	2.19	
Zr	188.19	49.270	0.32	

Acid Digested LMCS Standard F0979

Sample name : ~~4447~~  
 Sample code 1 : REAGIN  
 Sample code 2 : ~~LMCS~~  
 Sample code 3 : ~~PREFCT~~ ICP-B  
 Programme : SST ~~Digested STD~~  
 31-Mar-90 09:21:55

NAME	MV INT	CONCEN	RSD
Al	1.55	0.585	10.06
Sb	0.37	0.457	9.02
As	1.24	0.355	3.90
Br	2.50	0.019	12.39
Be	0.60	0.002	8.29
Bi	14.12	10.008	0.91
B	154.46	8.777	1.14
Cd	156.00	9.021	1.06
Ca	262.68	9.128	0.99
Ce	3.39	0.626	15.93
Cr	1.04	0.027	11.80
Co	0.20	0.178	13.89
Cu	59.24	8.842	1.03
Eu	2.56	0.009	16.79
Fe	1.63	0.070	7.41
La	3.41	0.428	0.84
Pb	0.73	0.796	1.46
Li	2.59	0.021	16.39
Mg	234.49	9.103	0.47
Mn	1.07	0.028	2.00
Hg	3.44	0.036	6.03
Mo	64.17	9.689	0.81
Nd	3.70	0.635	11.18
Ni	2.78	0.041	14.82
P	11.10	9.446	4.11
K	4.45	9.202	0.43
Sm	3.12	0.474	20.95
Se	1.40	0.320	15.01
Si	12.72	5.697	3.13
Aq	207.26	7.218	0.65
Na	15.97	0.036	0.52
Sr	313.06	8.946	0.96
S	0.80	0.308	2.51
Ta	2.55	0.112	13.27
Tl	2.72	0.664	10.42
Th	0.78	0.432	16.07
Sn	1.42	0.213	5.24
Ti	3.13	0.072	4.45
W	1.34	0.246	5.04
U	3.18	3.536	17.34
V	3.01	0.028	16.09
Zn	295.15	8.780	0.31
Zr	3.33	0.058	20.65

## Reagent Blank F0487

Sample name : F487  
 Sample code 1 : BLANK  
 Sample code 2 : 09072  
 Sample code 3 : DIRECT  
 Programme : SST

31-Mar-90 09:27:38

NAME	MV	INT	CONCEN	RSD
Al	1.35	0.167	10.32	
Si	0.36	0.230	12.49	
As	0.78	0.015	57.74	
Ba	2.19	0.003	20.16	
Be	0.55	0.001	15.95	
Bi	3.15	0.348	7.78	
Br	5.43	0.159	6.20	
Cd	1.81	0.009	7.51	
Ca	2.77	0.084	0.50	
Ce	3.01	0.068	39.39	
Cr	0.93	0.001	53.91	
Co	0.19	0.043	57.28	
Cu	1.91	0.014	15.11	
Eu	2.29	0.001	60.88	
Fe	1.46	0.050	2.43	
La	0.32	0.093	164.90	
Pb	0.25	0.158	26.02	
Li	2.41	0.007	11.76	
Mn	0.81	0.019	0.31	
Mn	0.87	0.016	2.35	
Hg	3.21	0.020	9.52	
Mo	1.35	0.008	43.01	
Nd	3.13	-0.094	-41.11	
Ni	2.55	0.015	20.42	
P	0.93	0.120	11.72	
K	2.02	0.121	42.97	
Sm	2.85	0.059	54.76	
Se	1.28	0.102	14.90	
St	2.42	0.213	9.40	
Ag	8.32	0.007	47.07	
Na	3.34	0.270	2.68	
Sr	2.41	0.003	13.93	
S	0.68	0.173	4.58	
Ta	2.32	0.024	2.49	
Tl	2.41	0.078	42.97	
Th	0.71	0.064	38.49	
Sn	1.07	0.057	10.29	
Ti	2.97	0.058	1.85	
W	1.03	0.038	7.22	
U	2.83	0.272	70.94	
V	2.73	0.004	62.20	
Zn	6.43	0.131	0.16	
Zr	3.15	0.009	29.30	

Sample 89-072, F0480

Sample name : F4R0  
Sample code 1 : SAMPLE  
Sample code 2 : 100-10  
Sample code 3 : 89072  
Programme : SST 31-Mar-90 09:33:11

NAME	MV	INT	CONCEN	DILCOR	RSD
Al	2.95	3.515	355.00	1.81	
Sb	0.36	0.238	24.029	28.35	
As	0.91	0.040	3.994	25.30	
Ba	2.48	0.018	1.825	9.78	
Be	0.57	0.001	0.140	7.53	
Pi	3.48	0.636	64.267	5.77	
R	4.27	0.092	9.327	5.39	
Cd	1.80	0.008	0.842	8.18	
Ca	1.71	0.047	4.741	0.31	
Ce	3.21	0.355	35.820	19.15	
Cr	1.23	0.076	7.654	6.27	
Co	0.20	0.108	10.884	17.32	
Cu	2.00	0.027	3.758	12.47	
Eu	2.46	0.006	0.587	20.83	
Fe	6.46	0.653	65.956	0.34	
La	0.29	0.023	2.359	30.53	
Pb	0.24	0.112	11.319	0.00	
Li	2.46	0.011	1.139	22.63	
Mg	3.15	0.110	11.139	0.56	
Mn	9.61	0.517	52.169	0.33	
Hg	4.91	0.141	14.230	21.82	
No	1.39	0.013	1.266	34.16	
Nd	3.34	0.177	17.919	45.40	
Ni	2.73	0.035	3.579	14.64	
P	1.02	0.215	21.707	6.66	
K	2.10	0.442	44.641	23.56	
Sm	3.04	0.351	35.419	21.23	
Se	1.34	0.203	20.484	12.99	
Si	3.70	0.362	36.547	4.35	
Ag	8.84	0.026	2.586	20.10	
Na	8.80	4.112	415.33	0.77	
Sr	4.06	0.050	5.070	1.55	
S	0.62	0.094	9.476	11.35	
Ia	2.45	0.074	2.443	20.99	
Tl	2.63	0.506	51.062	16.57	
Ih	0.75	0.270	27.272	17.21	
Sn	1.02	0.036	3.673	18.68	
Ti	2.46	0.015	1.517	19.74	
W	1.06	0.062	6.214	17.53	
U	3.08	2.636	266.23	17.09	
V	2.94	0.021	2.145	12.16	
Zn	2.45	0.012	1.174	9.00	
Zr	3.30	0.051	5.117	18.41	

Dilution factor : 101.000

## Sample 89-072, F0480

Sample name : F480  
 Sample code 1 : 500-10  
 Sample code 2 : SAMPLE  
 Sample code 3 : 89072  
 Programme : SST                            31-Mar-90 09:30:34

NAME	MV	INT	CONCEN	DILCOR	RSD
Al	12.28	23.113	405.38	2.44	
Sb	0.37	0.447	9.393	5.53	
As	0.86	0.076	1.594	13.59	
Br	2.83	0.036	0.748	2.75	
Be	0.59	0.002	0.047	2.21	
Bi	6.07	2.917	61.248	1.66	
B	3.72	0.060	1.205	5.96	
Cd	1.88	0.013	0.266	4.03	
Ca	6.39	0.210	4.406	2.41	
Ce	3.36	0.584	12.261	7.67	
Cr	3.81	0.478	10.028	2.11	
Co	0.21	0.226	4.753	8.25	
Cu	3.15	0.052	1.082	3.88	
Eu	2.59	0.010	0.305	7.55	
Fe	35.65	4.173	87.624	2.34	
La	0.31	0.059	1.245	2.62	
Pb	0.25	0.310	6.507	6.38	
Li	2.53	0.010	0.372	8.96	
Hg	2.29	0.077	1.613	2.31	
Mn	58.02	3.332	69.976	1.99	
Hg	5.34	0.172	3.602	18.06	
Mo	1.48	0.026	0.355	7.90	
Nd	3.49	0.363	7.633	15.01	
Ni	3.39	0.108	2.258	3.27	
P	1.87	0.991	20.810	1.70	
K	2.18	0.716	15.034	5.75	
Sm	3.18	0.569	11.941	8.04	
Se	1.52	0.545	11.448	2.74	
Si	3.73	0.900	19.064	1.76	
Ag	9.38	0.045	0.949	6.83	
Na	40.01	25.719	540.11	2.19	
Sr	12.83	0.303	6.359	2.35	
S	0.90	0.426	0.946	4.84	
Ta	2.56	0.117	2.465	9.99	
Tl	2.92	1.047	21.980	7.66	
Th	0.78	0.435	9.140	7.35	
Sn	1.08	0.065	1.360	6.99	
Ti	2.61	0.028	0.592	5.48	
W	1.14	0.112	2.343	9.85	
U	3.55	7.023	147.40	2.94	
V	3.22	0.046	0.961	3.57	
Zn	3.65	0.048	1.002	1.51	
Zr	3.56	0.119	2.503	3.56	

Dilution factor : 21.0000

Sample 89-072 Duplicate, F0481

Sample name	:	F0481			
Sample code 1	:	NUPSAH			
Sample code 2	:	100-10			
Sample code 3	:	09072			
Programme	:	SST			
		31-Mar-90 09:43:18			
NAME	MV	INT	CONCEN	ULICOR	RSD
Al	3.06	3.765	380.31	0.47	
Si	0.36	0.233	23.549	12.24	
As	0.80	0.029	2.903	4.44	
Ba	2.26	0.007	0.683	15.68	
Be	0.56	0.001	0.103	11.51	
Bi	3.40	0.564	56.938	5.38	
B	3.16	0.028	2.836	12.40	
Cd	1.72	0.003	0.350	9.28	
Ca	1.52	0.040	4.056	0.95	
Ce	3.06	0.146	14.755	27.78	
Cr	1.18	0.064	6.502	1.36	
Co	0.20	0.097	9.795	41.94	
Cu	1.90	0.013	1.281	14.08	
Dy	2.33	0.002	0.236	25.07	
Fe	6.48	0.655	66.151	0.41	
La	0.29	0.013	1.361	30.55	
Pb	0.25	0.158	15.980	31.46	
Li	2.35	0.003	0.289	55.45	
Mg	0.66	0.013	1.360	0.17	
Mn	10.10	0.545	55.017	0.20	
Hg	4.44	0.107	10.831	34.39	
Mo	1.35	0.007	0.680	24.05	
Nd	3.17	-0.043	-4.327	-37.85	
Ni	2.66	0.027	2.733	10.34	
P	1.02	0.210	21.183	18.60	
K	2.02	0.123	12.449	26.48	
Sm	2.90	0.134	13.510	31.28	
Se	1.29	0.112	11.275	0.39	
Si	2.47	0.239	24.137	2.48	
Ag	8.42	0.010	1.036	25.07	
Na	9.32	4.420	446.46	0.39	
Sr	4.09	0.051	5.169	0.55	
S	0.61	0.082	0.237	3.85	
Ta	2.34	0.032	3.264	9.32	
Tl	2.52	0.296	29.056	24.90	
Th	0.72	0.115	11.662	23.98	
Sn	0.97	0.017	1.712	10.19	
Ti	2.37	0.008	0.764	22.97	
W	1.02	0.035	3.551	17.45	
U	2.95	1.411	142.49	15.49	
V	2.03	0.012	1.250	17.56	
Zn	2.31	0.008	0.766	7.42	
Zr	3.21	0.025	2.536	17.06	

Dilution factor : 101.000

Sample 89-072 Duplicate, F0481

Sample name : F0481  
 Sample code 1 : 500-10  
 Sample code 2 : DUPSAM  
 Sample code 3 : 89072  
 Programme : SST                            31-Mar-90 09:48:33

NAME	MV	INT	CONCEN	DILCOR	RSD
Al	9.47	17.224	361.71	0.52	
Sb	0.35	0.167	3.497	13.09	
As	0.79	0.024	0.495	40.63	
Br	2.51	0.019	0.404	12.36	
Bm	0.55	0.001	0.017	42.74	
Bi	5.06	2.024	42.500	2.38	
B	3.10	0.025	0.521	21.16	
Cd	1.71	0.003	0.063	30.33	
Ca	5.04	0.163	3.415	0.70	
Cr	3.02	0.079	1.663	127.44	
Cr	2.29	0.346	7.262	1.95	
Co	0.19	0.011	0.226	229.13	
Cu	1.95	0.020	0.429	24.05	
Eu	2.31	0.001	0.026	144.06	
Fo	26.09	3.020	63.413	0.36	
La	0.29	0.013	0.283	80.03	
Pb	0.24	0.066	1.384	17.32	
Li	2.31	-0.001	-0.013	-617.37	
Mg	1.75	0.056	1.172	0.44	
Mn	44.75	2.327	53.072	0.34	
Hg	4.07	0.081	1.701	20.49	
Mo	1.36	0.008	0.169	44.44	
Nd	3.15	-0.069	-1.454	-159.46	
Ni	2.98	0.062	1.308	12.15	
P	1.43	0.588	12.354	6.91	
K	1.99	0.032	0.680	455.80	
Sm	2.86	0.067	1.399	145.68	
Se	1.37	0.264	5.535	16.54	
Si	3.49	0.782	16.421	3.11	
Ag	8.37	0.008	0.177	83.30	
Na	32.64	20.601	432.63	0.67	
Sr	10.42	0.233	4.899	0.34	
S	0.76	0.266	5.570	3.82	
Ta	2.31	0.021	0.437	89.78	
Tl	2.58	0.410	8.605	38.25	
Th	0.71	0.069	1.455	85.77	
Sn	0.99	0.026	0.536	34.15	
Ti	2.39	0.009	0.188	40.07	
W	1.04	0.044	0.920	23.86	
U	3.14	3.208	67.373	17.94	
V	2.91	0.020	0.410	20.30	
Zn	2.75	0.021	0.438	5.06	
Zr	3.30	0.048	1.017	23.70	

Dilution factor : 21.0000

Spike of Sample 89-072, F0482

Sample name	:	F0482
Sample code 1	:	100-10
Sample code 2	:	SPIKE
Sample code 3	:	09072
Programme	:	SST
		31-Mar-90 09:57:14

NAME	MV	INT	CONCEN	DILCOR	RSD
A1	3.26	4.170	421.18	1.14	
Sb	0.37	0.395	39.889	4.17	
As	0.84	0.057	5.805	0.00	
Ba	4.91	0.141	14.200	0.33	
Be	0.58	0.002	0.184	11.64	
Bi	3.64	0.772	78.005	3.98	
Br	3.68	0.058	5.872	1.27	
Ca	2.38	0.042	4.276	1.05	
Co	2.52	0.075	7.578	0.51	
Cr	3.36	0.504	50.971	1.39	
Cr	1.74	0.206	20.830	1.54	
Co	0.21	0.302	30.474	3.09	
Cu	2.24	0.064	6.502	0.73	
Eu	2.57	0.009	0.912	1.60	
Fe	7.30	0.754	76.167	0.76	
La	0.31	0.076	7.712	4.08	
Pb	0.25	0.297	29.962	10.18	
Li	4.17	0.143	14.445	0.41	
Mg	1.56	0.048	4.891	0.49	
Mn	12.38	0.675	68.159	0.73	
Hg	3.26	0.059	5.969	12.03	
Mo	1.64	0.052	5.272	1.78	
Nd	3.53	0.416	42.044	11.98	
Ni	4.02	0.177	17.860	1.82	
P	1.13	0.315	31.821	1.75	
K	2.17	0.690	69.665	2.56	
Sm	3.16	0.538	54.355	1.59	
Se	1.40	0.318	32.072	3.53	
Si	2.51	0.259	26.164	1.44	
Am	10.10	0.071	7.190	2.61	
Na	9.35	4.440	440.44	0.43	
Sr	5.31	0.086	8.728	0.29	
S	0.63	0.109	10.996	8.66	
Ta	2.60	0.131	13.214	4.32	
Tl	2.73	0.691	69.834	18.77	
Th	0.77	0.403	40.728	0.00	
Sn	1.37	0.190	19.316	1.65	
Ti	4.07	0.151	15.293	0.51	
W	1.09	0.081	8.149	9.52	
U	3.22	3.889	392.78	1.31	
V	3.01	0.027	2.758	15.11	
Zn	3.51	0.044	4.395	1.01	
Zr	3.89	0.205	20.739	0.22	

Dilution factor : 101.000

Spike of Sample 89-072, F0482

Sample name : F482  
Sample code 1 : 500-10  
Sample code 2 : SPIKE  
Sample code 3 : 89072  
Programme : SST 31-Mar-90 10:03:05

NAME	MV	INT	CONCEN	DILCOR	RSD
A1	9.57	17.431	366.06	0.75	
Sb	0.35	0.200	4.197	22.96	
As	0.83	0.049	1.026	7.74	
Br	13.30	0.564	11.839	0.43	
Br	0.56	0.001	0.023	13.90	
Bi	4.96	1.941	40.754	1.27	
B	5.17	0.145	3.035	2.42	
Cd	3.98	0.135	2.843	1.67	
Ca	9.31	0.311	6.536	0.39	
Ce	3.12	0.225	4.731	20.68	
Cr	4.17	0.821	17.251	0.79	
Co	0.22	0.496	10.409	6.79	
Cu	2.84	0.157	3.290	1.76	
Eu	2.36	0.003	0.059	24.12	
Fe	26.79	3.105	65.199	0.30	
La	0.34	0.146	3.075	1.06	
Pb	0.25	0.316	6.645	7.22	
Li	9.61	0.563	11.831	0.24	
Mg	5.37	0.197	4.129	0.80	
Mn	49.39	2.793	58.645	0.51	
Hg	3.28	0.024	0.510	3.83	
Mo	2.22	0.142	2.981	0.98	
Nd	4.83	2.113	44.364	136.07	
Ni	7.78	0.589	12.359	1.52	
P	1.62	0.762	16.002	3.16	
K	3.04	0.193	4.053	31.53	
Sm	3.86	0.076	1.594	58.87	
Se	1.49	0.477	10.016	4.60	
Si	3.02	0.531	11.156	1.80	
Ag	12.23	0.148	3.116	2.23	
Na	29.58	18.479	308.06	0.41	
Sr	14.50	0.351	2.369	0.51	
S	0.77	0.270	5.670	3.99	
T <sub>1</sub>	2.66	0.157	3.296	5.67	
Tl	2.58	0.405	8.512	21.03	
Ih	0.71	0.091	1.903	32.40	
Sn	2.28	0.585	12.284	2.78	
Ti	9.08	0.576	12.091	1.09	
W	1.03	0.041	0.861	8.13	
U	3.15	3.267	68.607	8.32	
V	2.89	0.018	0.374	1.38	
Zn	7.26	0.156	3.274	0.54	
Zr	5.39	0.606	12.724	1.23	

Dilution factor : 21.0000

Acid Digested LMCS Check Standard

Sample name : ICPDR  
 Sample code 1 : DIRECT  
 Sample code 2 : DIRECT  
 Sample code 3 : 89072  
 Programme : SST                            31-Mar-90 10:08:11

NAME	MV	INT	CONCEN	RSD
Al	5.46	8.804	3.01	
St	0.36	0.266	29.50	
As	1.10	0.254	3.10	
Ba	163.24	8.131	1.43	
Be	0.63	0.003	12.32	
Bi	3.27	0.448	16.94	
B	3.38	0.041	13.12	
Cd	1.95	0.017	1.21	
Ca	9.14	0.306	1.74	
Cr	8.20	7.725	4.45	
Cr	31.99	7.874	3.17	
Co	0.62	6.956	5.71	
Cu	1.94	0.018	44.11	
Eu	3.02	0.023	11.86	
Fe	69.27	8.227	2.83	
La	0.31	0.057	24.05	
Pb	0.25	0.158	31.46	
Li	197.26	8.106	1.54	
Mg	2.19	0.073	3.25	
Mn	142.55	8.124	2.03	
Hg	3.22	0.020	5.99	
Mo	1.52	0.033	16.07	
Nd	8.96	7.465	1.44	
Ni	75.97	8.069	3.54	
P	1.00	0.194	19.87	
K	1.99	0.034	657.59	
Sm	2.86	0.073	202.98	
Se	2.99	3.273	4.66	
Si	3.11	0.578	7.39	
Ag	9.71	0.057	19.17	
Na	3.35	0.272	24.50	
Sr	2.49	0.005	34.05	
S	0.74	0.235	9.11	
Ta	22.70	7.929	4.62	
Tl	2.77	0.768	17.25	
Th	0.77	0.393	27.55	
Sn	20.05	8.310	4.73	
Ti	99.62	8.246	2.28	
U	1.07	0.067	31.08	
V	3.38	5.420	17.82	
V	2.93	0.021	27.16	
Zn	3.86	0.054	4.01	
Zr	34.56	8.373	2.59	

Nitric Acid Blank

Sample name	:	HNO3		
Programme	:	SST	31-Mar-90 10:12:36	
NAME	MV	INT	CONCEN	RSD
Al	1.30	0.227	4.30	
Sb	0.36	0.314	13.12	
As	0.81	0.040	14.90	
Ba	2.32	0.010	3.29	
Be	0.57	0.001	2.51	
Bi	3.06	0.266	5.43	
B	3.00	0.019	6.04	
Cd	1.80	0.008	8.83	
Ca	0.38	0.001	5.36	
Co	3.26	0.441	3.58	
Cr	0.92	-0.002	-198.70	
Co	0.20	0.167	9.68	
Cu	1.98	0.025	3.06	
Dy	2.50	0.007	2.46	
Fe	1.15	0.013	5.81	
La	0.30	0.037	14.63	
Pb	0.25	0.171	0.00	
Li	2.51	0.015	2.85	
Mg	0.34	0.001	10.17	
Mn	0.62	0.002	16.04	
Hg	3.04	0.008	45.67	
Mo	1.39	0.014	2.77	
Nd	4.61	1.825	156.22	
Ni	2.68	0.029	5.00	
P	0.93	0.133	16.93	
K	2.12	0.524	6.80	
Sm	3.09	0.436	3.65	
Se	1.33	0.189	15.02	
Si	2.21	0.099	4.50	
Ag	8.98	0.031	4.97	
Na	3.20	0.170	3.19	
Sr	2.49	0.005	3.54	
S	0.58	0.046	19.58	
Ta	2.47	0.084	11.41	
Tl	2.66	0.553	4.17	
Tn	0.76	0.332	4.90	
Sn	1.02	0.039	1.92	
Ti	2.47	0.016	4.81	
W	1.07	0.063	9.28	
U	3.07	2.549	3.65	
V	2.96	0.024	13.91	
Zn	2.25	0.006	11.51	
Zr	3.31	0.053	4.33	

## LMCS Check Standard #78C11F

Sample name : 78C11F  
 Sample code 1 : SST1  
 Programme : SST

31-Mar-90 10:16:39

NAME	MV	INT	CONCEN	RSD
Al	1.51	0.493	10.46	
Sb	1.11	11.063	1.20	
As	0.97	0.195	6.74	
Ba	199.34	9.954	0.69	
Be	0.61	0.003	11.35	
Bi	3.27	0.453	14.62	
B	178.94	10.192	0.64	
Cd	178.48	10.335	2.22	
Ca	295.80	10.280	0.77	
Cr	9.83	10.133	1.99	
Cr	40.49	10.028	1.46	
Co	0.73	8.777	2.50	
Cu	67.39	10.098	0.69	
Eu	3.40	0.035	4.28	
Fe	86.17	10.265	1.51	
La	0.33	0.115	6.20	
Pb	0.26	0.363	8.33	
Li	130.20	9.878	0.27	
Hg	268.57	10.428	1.63	
Mn	179.15	10.218	1.44	
Hg	3.32	0.020	19.89	
Mo	1.54	0.037	13.13	
Nd	10.53	9.503	1.12	
Ni	96.77	10.350	1.88	
P	1.00	0.199	14.13	
K	8.86	25.693	1.06	
Sm	3.15	0.520	17.60	
Se	3.58	4.366	1.68	
Si	3.35	0.171	12.20	
Ag	9.31	0.043	14.43	
Na	30.97	24.998	0.90	
Sr	355.29	10.161	0.84	
S	0.82	0.329	6.38	
Ta	2.61	0.136	14.32	
Tl	2.88	0.984	12.07	
Th	0.82	0.673	8.83	
Sn	125.60	54.193	2.35	
Ti	2.53	0.021	15.34	
U	1.40	0.280	0.76	
U	3.58	7.261	7.98	
V	3.01	0.028	24.23	
Zn	342.85	10.209	1.62	
Zr	3.41	0.079	13.71	

*Stocks used*  
*for making std F911, F912*

V

## LMCS Check Standard #82B38C

Sample name	:	82B38C		
Sample code 1	:	SST2		
Programme	:	55T		
		31-Mar-90 10:20:55		
NAME	MV	INT	CONCEN	RSD
Al	3.38	4.420	0.14	
Si	0.39	0.723	3.01	
As	2.62	1.370	0.50	
Na	2.55	0.021	1.30	
Be	0.57	0.002	6.47	
Bi	63.07	53.156	0.29	
B	5.27	0.150	10.48	
Cd	1.87	0.012	4.50	
Ca	0.95	0.021	0.17	
Ce	3.46	0.732	1.41	
Cr	1.28	0.088	2.89	
Co	0.20	0.070	23.08	
Cu	0.30	0.233	0.23	
Eu	332.40	10.123	0.16	
Fe	1.59	0.065	6.20	
La	18.22	>48.331	0.16	
Pb	2.85	51.618	0.24	
Li	2.41	0.007	19.97	
Mg	0.56	0.009	0.83	
Mn	0.78	0.011	3.03	
Hg	0.49	0.040	3.38	
Mo	1.47	0.026	10.88	
Nd	3.82	0.802	7.20	
Ni	2.76	0.039	11.30	
P	1.19	0.365	2.69	
K	2.01	0.090	21.14	
Sm	9.51	10.381	0.13	
Se	1.44	0.397	4.87	
Si	3.22	0.635	0.34	
Aq	296.70	10.462	0.27	
Na	3.09	0.093	9.48	
Sr	2.64	0.010	2.27	
S	0.67	0.158	3.04	
Ta	2.83	0.223	1.83	
Tl	5.72	6.374	1.69	
Th	10.73	53.508	0.07	
Sn	1.19	0.111	3.05	
Ti	2.95	0.057	0.67	
W	1.08	0.070	4.76	
U	8.71	54.007	0.16	
V	5.65	0.252	0.37	
Zn	2.56	0.015	3.51	
Zr	3.68	0.150	1.07	

## LMCS Check Standard #77C11F

Sample name : 77C11E  
 Sample code 1 : SST3  
 Programme : SST                    31-Mar-90 10:25:16

NAME	MV	INT	CONCEN	RSD
Al	26.72	150.443	0.73	
Sb	0.44	1.408	11.88	
As	72.33	52.741	1.99	
Br	2.53	0.020	12.72	
Be	304.80	9.855	0.74	
Pi	3.99	1.087	3.98	
B	5.07	0.138	10.87	
Cd	2.02	0.021	6.66	
Ca	0.96	0.021	1.09	
Ce	3.10	0.194	55.22	
Cr	1.04	0.029	26.43	
Co	0.20	0.108	17.32	
Cu	2.20	0.059	10.57	
Eu	2.40	0.004	46.94	
Fe	1.43	0.047	4.02	
La	0.29	0.014	47.19	
Pb	0.26	0.349	5.66	
Li	2.37	0.004	94.73	
Mg	0.46	0.006	3.84	
Mn	0.90	0.018	3.40	
Hg	341.91	24.203	2.40	
Mo	331.23	50.850	1.36	
Nd	3.24	0.044	207.49	
Ni	6.74	0.474	3.73	
P	52.52	47.379	4.36	
K	2.02	0.130	103.21	
Sm	2.96	0.235	45.30	
Se	28.70	51.106	1.07	
Si	82.03	42.612	3.11	
Ag	17.03	0.323	3.17	
Na	3.20	0.224	22.29	
Sr	2.50	0.005	24.27	
S	41.98	49.214	1.48	
Ta	123.91	47.179	1.44	
Tl	29.56	51.742	0.30	
Th	0.89	1.018	9.40	
Sn	1.51	0.251	5.21	
Ti	611.81	51.638	1.02	
W	32.40	21.245	2.32	
U	4.46	15.430	7.26	
V	120.24	10.011	0.89	
Zn	3.42	0.041	3.79	
Zr	197.78	51.822	1.12	

## **APPENDIX A**

## **ANALYTICAL ANALYSIS CARDS**

Physical Properties

Serial No. F 465.-5001	Sample Point SEGMENT-B	Date 11-30-89	Time Issued 8:31	Priority 18																									
Determination VOA SAMP	Method/Standard LI-000-200	Result Units NONE	Charge Code WB75L	Runno 0																									
Sample Size ?	Customer ID 89-072																												
Remarks, Calculations, Results: DUPLICATE SAMPLE      Bottles # 278																													
<p>Gross 31.63</p> <p>Tare 21.05</p> <p>Sample 10.58</p> <p>Wt/No 3133</p> <table border="1"> <tr> <td>Analyst - 1 RLR</td> <td>Analyst - 2 6097</td> <td>Analyst - 3</td> <td>Analyst - 4</td> <td>Analyst - 5</td> </tr> <tr> <td>KJP JRS</td> <td>60300 60500</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Hrs</td> <td>Hrs</td> <td>Hrs</td> <td>Hrs</td> <td>Hrs</td> </tr> <tr> <td>1-27-89</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Date</td> <td>Time Completed</td> <td>Lab Unit Mgr</td> <td colspan="2"></td> </tr> </table>					Analyst - 1 RLR	Analyst - 2 6097	Analyst - 3	Analyst - 4	Analyst - 5	KJP JRS	60300 60500				Hrs	Hrs	Hrs	Hrs	Hrs	1-27-89					Date	Time Completed	Lab Unit Mgr		
Analyst - 1 RLR	Analyst - 2 6097	Analyst - 3	Analyst - 4	Analyst - 5																									
KJP JRS	60300 60500																												
Hrs	Hrs	Hrs	Hrs	Hrs																									
1-27-89																													
Date	Time Completed	Lab Unit Mgr																											

54-6800-081 (R-10-63)

Serial No. F 465.-5000	Sample Point SEGMENT-B	Date 11-30-89	Time Issued 8:31	Priority 18
Determination APPR/OTR	Method/Standard LI-000-200	Result Units NONE	Charge Code WB75L	Runno 0
Sample Size ?	Customer ID 89-072			
Remarks, Calculations, Results: A: JAR ID# 255 B: JAR TARE WT. 220.3 C: JAR TOTAL WT. 400.92 D: C-B = 180.62 E: EST. VOL./LENGTH 10" F: VISUAL REMARKS Light brown solids. Upper 1.5 inches median brown. very smooth appearance				
Analyst - 1 RLR	Analyst - 2 6097	Analyst - 3	Analyst - 4	Analyst - 5
KJP JRS	60300 60500			
Hrs	Hrs	Hrs	Hrs	Hrs
1-27-89				
Date	Time Completed	Lab Unit Mgr		

54-6800-081 (R-10-63)

Serial No. F 465.-5003	Sample Point SEGMENT-B	Date 11-30-89	Time Issued 8:31	Priority 16																									
Determination HOMOGZT	Method/Standard LI-000-200	Result Units NONE	Charge Code WB75L	Runno 0																									
Sample Size ?	Customer ID 89-072																												
Remarks, Calculations, Results: Homogenization Complete part# 258																													
<p>Gross 22.54</p> <p>Tare 21.63</p> <p>Sample 0.91</p> <p>Wt/No. N 3134 pg 26</p> <table border="1"> <tr> <td>Analyst - 1 6097</td> <td>Analyst - 2</td> <td>Analyst - 3</td> <td>Analyst - 4</td> <td>Analyst - 5</td> </tr> <tr> <td>60300 60500</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Hrs</td> <td>Hrs</td> <td>Hrs</td> <td>Hrs</td> <td>Hrs</td> </tr> <tr> <td>1-28-90</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Date</td> <td>Time Completed</td> <td>Lab Unit Mgr</td> <td colspan="2"></td> </tr> </table>					Analyst - 1 6097	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	60300 60500					Hrs	Hrs	Hrs	Hrs	Hrs	1-28-90					Date	Time Completed	Lab Unit Mgr		
Analyst - 1 6097	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5																									
60300 60500																													
Hrs	Hrs	Hrs	Hrs	Hrs																									
1-28-90																													
Date	Time Completed	Lab Unit Mgr																											

54-6800-081 (R-10-63)

Serial No. F 465.-5002	Sample Point SEGMENT-B	Date 11-30-89	Time Issued 8:31	Priority 24																									
Determination PRT-SIZE	Method/Standard LI-000-200	Result Units NONE	Charge Code WB75L	Runno 0																									
Sample Size ?	Customer ID 89-072																												
Remarks, Calculations, Results: PARTICLE SIZE DISTRIBUTION																													
<p>Bottles # 279</p> <p>Gross 22.54</p> <p>Tare 21.63</p> <p>Results: scattered (6)</p> <p>part# 258</p> <table border="1"> <tr> <td>Analyst - 1 RLR</td> <td>Analyst - 2 188</td> <td>Analyst - 3</td> <td>Analyst - 4</td> <td>Analyst - 5</td> </tr> <tr> <td>KJP JRS</td> <td>2-2-89</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Hrs</td> <td>Hrs</td> <td>Hrs</td> <td>Hrs</td> <td>Hrs</td> </tr> <tr> <td>1-28-90</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Date</td> <td>Time Completed</td> <td>Lab Unit Mgr</td> <td colspan="2">GMS</td> </tr> </table>					Analyst - 1 RLR	Analyst - 2 188	Analyst - 3	Analyst - 4	Analyst - 5	KJP JRS	2-2-89				Hrs	Hrs	Hrs	Hrs	Hrs	1-28-90					Date	Time Completed	Lab Unit Mgr	GMS	
Analyst - 1 RLR	Analyst - 2 188	Analyst - 3	Analyst - 4	Analyst - 5																									
KJP JRS	2-2-89																												
Hrs	Hrs	Hrs	Hrs	Hrs																									
1-28-90																													
Date	Time Completed	Lab Unit Mgr	GMS																										

54-6800-081 (R-10-63)

pH Analysis of Solid Sample

Serial No. F 485.-5315	Sample Point SEGMENT-V	Date 11-30-89	Time Issued 8:38	Priority 18
Determination pH	Method/Standard LA-212-103	Result Units NONE	Charge Code WB75L	Reurns 0
Sample Size ? 1 ml	Customer ID 089072			
Remarks, Calculations, Results: LMCS CHECK SAMPLE pH FOUND 9.92 STD ID LA-212-103 SAMPLE TEMP 21.9				
Analyst - 1 GC269	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 REBhardt
Moody Traylor	Hrs	Hrs	Hrs	Hrs
Date 3-6-90	Time Completed 3/8 1150	Lab Unit Mgr CJA	md	
54-6800-061 (R-10-83)				

Serial No. F 464.-5515	Sample Point SEGMENT-A	Date 11-30-89	Time Issued 8:31	Priority 19
Determination pH	Method/Standard LA-212-103	Result Units % RECOVERY	Charge Code WB75L	Reurns 0
Sample Size ? 1 ml	Customer ID 089072			
Remarks, Calculations, Results: LMCS CHECK SAMPLE pH FOUND 100.08 STD ID LA-212-103 SAMPLE TEMP 22.0				
Analyst - 1 GC269	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 REBhardt
Moody Traylor	Hrs	Hrs	Hrs	Hrs
Date 3-6-90	Time Completed 3/8 1151	Lab Unit Mgr CJA	md	
54-6800-061 (R-10-83)				

Serial No. F 466.-5115	Sample Point SEGMENT-C	Date 11-30-89	Time Issued 8:32	Priority 19
Determination pH	Method/Standard LA-212-103	Result Units NONE	Charge Code WB75L	Reurns 0
Sample Size ? 2.467g / 2.467ml	Customer ID 89072			
Remarks, Calculations, Results: pH 12.53 SAMPLE TEMP 22.0				
Analyst - 1 GC269	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 REBhardt
Moody Traylor	Hrs	Hrs	Hrs	Hrs
Date 3-6-90	Time Completed 3/8 1152	Lab Unit Mgr CJA	md	
54-6800-061 (R-10-83)				

Serial No. F 465.-5015	Sample Point SEGMENT-B	Date 11-30-89	Time Issued 8:31	Priority 19
Determination pH	Method/Standard LA-212-103	Result Units NONE	Charge Code WB75L	Reurns 0
Sample Size ? 2.542g / 2.542ml	Customer ID 89072			
Remarks, Calculations, Results: pH 12.53 SAMPLE TEMP 21.9 +364 9.98g				
Analyst - 1 GC269	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 REBhardt
Moody Traylor	Hrs	Hrs	Hrs	Hrs
Date 3-6-90	Time Completed 3/8 11	Lab Unit Mgr CJA	md	
54-6800-061 (R-10-83)				

pH Analysis of Solid Sample

Serial No F 468.-5515	Sample Point SEGMENT-E	Date 11-30-89	Time Issued 8:33	Priority 19
Determination dH	Method/Standard LA-212-103	Result Units % RECOVERY	Charge Code WB75L	Return 0
Sample Size ? <i>1 ml</i>				Customer ID <b>689072</b>
Remarks, Calculations, Results: LMCS CHECK SAMPLE <i>10.09</i> OH FOUND <i>10.09</i> STD ID <i>12211-B</i> SAMPLE TEMP <i>21.9</i>				
Analyst - 1 <i>CC269</i> <i>Mary Beale</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>REmark</i>
Date <i>3-6-90</i>	Time Completed <i>3/8 1149</i>	Lab Unit/Mgr <i>CJW</i>	Comments <i>100.98</i>	

*10.09 / 10.00*

54-5800-061 (R-10-82)

Percent Water Analysis

Serial No. F 437.-5310	Sample Point SEGMENT-V	Date 11-30-89	Time Issued 8: 9	Priority 18
Determination % H <sub>2</sub> O	Method/Standard LA-564-101	Result Units %	Charge Code WB75L	Runno 0
Sample Size ?	Customer ID <b>689070</b>			
Remarks, Calculations, Results: REAGENT BLANK 0 .0065 0 .0069 21.5642C 21.6807 .0062g 21.5642T 21.6807 21.5578W1 21.6748 21.5576W2 21.6746				
Analyst - 1 <i>68598/RH</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>RELENT</i>
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-2-90	Time Completed	Lab Unit Mgr <i>CJA</i>	<i>OK</i>	
54-6800-061 (R-10-63)				

Serial No. F 416.-5510	Sample Point SEGMENT-A	Date 11-30-89	Time Issued 8: 5	Priority 19
Determination % H <sub>2</sub> O	Method/Standard LA-564-101	Result Units % RECOVERY	Charge Code WB75L	Runno 0
Sample Size ?	Customer ID <b>89-070</b>			
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID <u>11011AB</u> 0 57.76 22.8786 22.8859 99.30% 58.16 21.4798 T 21.5004 57.96 / 58.98 22.0651 W1 22.0857 22.0632 W2 22.0811				
Analyst - 1 <i>68598/RH</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>RELENT</i>
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-2-90	Time Completed	Lab Unit Mgr <i>CJA</i>	<i>OK</i>	
54-6800-061 (R-10-63)				

Serial No. F 466.-5110	Sample Point SEGMENT-C	Date 11-30-89	Time Issued 8:32	Priority 19
Determination % H <sub>2</sub> O	Method/Standard LA-564-101	Result Units %	Charge Code WB75L	Runno 0
Sample Size ?	Customer ID <b>89072</b>			
Remarks, Calculations, Results: DUPLICATE SAMPLE: G. 21.9696 44.43% T. 21.2286 W1 21.6409 44.36% W2 21.6402				
Analyst - 1 <i>68598/RH</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>RELENT</i>
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-2-90	Time Completed	Lab Unit Mgr <i>CJA</i>	<i>OK</i>	
54-6800-061 (R-10-63)				

Serial No. F 465.-5010	Sample Point SEGMENT-B	Date 11-30-89	Time Issued 8:31	Priority 19
Determination % H <sub>2</sub> O	Method/Standard LA-564-101	Result Units %	Charge Code WB75L	Runno 0
Sample Size ?	Customer ID <b>89072</b>			
Remarks, Calculations, Results: G. 22.1085 3.61g T. 21.4278 44.10% W1 21.8083 W2 21.8077 HC N 313 4				
Analyst - 1 <i>68598/RH</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>RELENT</i>
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-2-90	Time Completed	Lab Unit Mgr <i>CJA</i>	<i>OK</i>	
54-6800-061 (R-10-63)				

Percent Water Analysis

Serial No. F 564.-5510	Sample Point SEGMENT-E	Date 12- 1-89	Time Issued 11:34	Priority 19																				
Determination % H <sub>2</sub> O	Method/Standard LA-564-101	Result Units % RECOVERY	Charge Code WB75L	Reurn 0																				
Sample Size ?				Customer ID <b>089076</b>																				
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID 112114A <table style="margin-left: 20px;"> <tr><td>(3)</td><td>57.77</td><td>57.18%</td><td>58.98</td></tr> <tr><td>G</td><td>22.9823</td><td>22.9187</td><td>95%</td></tr> <tr><td>T</td><td>21.59560</td><td>21.5377</td><td>96%</td></tr> <tr><td>W1</td><td>22.1812</td><td>22.1374</td><td></td></tr> <tr><td>W2</td><td>22.1780</td><td>22.1310</td><td></td></tr> </table>					(3)	57.77	57.18%	58.98	G	22.9823	22.9187	95%	T	21.59560	21.5377	96%	W1	22.1812	22.1374		W2	22.1780	22.1310	
(3)	57.77	57.18%	58.98																					
G	22.9823	22.9187	95%																					
T	21.59560	21.5377	96%																					
W1	22.1812	22.1374																						
W2	22.1780	22.1310																						
Analyst - 1 <b>6055R</b>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>John Doe</i>																				
Hrs	Hrs	Hrs	Hrs	Hrs																				
Date 3-2-90	Time Completed	Lab Unit Mag	<i>EGR</i> <i>JK</i>																					

54-5800-061 (R-10-42)

Fusion Dissolution

<i>or F465</i>				
Serial No. <b>F 470.-6000</b>	Sample Point <b>SEGMENT-G</b>	Date <b>11-30-89</b>	Time issued <b>8:33</b>	Priority <b>18</b>
Determination <b>FUSION</b>	Method/Standard <b>LA-549-141</b>	Result Units <b>G/L</b>	Charge Code <b>WB75L</b>	Return <b>0</b>
Sample Size <b>?</b>	Customer ID <b>R9072</b>			
Remarks, Calculations, Results: GRAMS SAMPLE <u>5754</u> VOLUME ON COMPLETION <u>200 mL</u> SEQUENCE #: 63 WT 1: 43.7549 WT 2: 44.3383 NET WEIGHT: <u>2.88 -3 g/ml</u> ----> 0.5754 GRAMS 11-30-90 @ 14:35:23 <i>WTC N 3T3 4</i>				
Analyst -1 <u>6B598/H</u>	Analyst -2	Analyst -3	Analyst -4	Analyst -5 <i>an</i>
Hrs	Hrs	Hrs	Hrs	Hrs
Date <b>3-10-90</b>	Time Completed	Lab Unit Mgr <b>bx</b>		<i>bx</i>
54-6800-061 (R-10-62)				
Serial No. <b>F 471.-6100</b>	Sample Point <b>SEGMENT-H</b>	Date <b>11-30-89</b>	Time issued <b>8:34</b>	Priority <b>18</b>
Determination <b>FUSION</b>	Method/Standard <b>LA-549-141</b>	Result Units <b>G/L</b>	Charge Code <b>WB75L</b>	Return <b>0</b>
Sample Size <b>?</b>	Customer ID <b>R9072</b>			
Remarks, Calculations, Results: DUPLICATE ANALYSIS GRAMS SAMPLE <u>7039</u> VOLUME ON COMPLETION <u>200 mL</u> SEQUENCE #: 64 WT 1: 40.5933 WT 2: 41.2972 NET WEIGHT: <u>3.52 -3 g/ml</u> ----> 0.7909 GRAMS 11-30-90 @ 14:37:17 <i>WTC N 3T3 4</i>				
Analyst -1 <u>6B598/H</u>	Analyst -2	Analyst -3	Analyst -4	Analyst -5 <i>an</i>
Hrs	Hrs	Hrs	Hrs	Hrs
Date <b>3-10-90</b>	Time Completed	Lab Unit Mgr <b>bx</b>		<i>bx</i>
54-6800-061 (R-10-62)				
Serial No. <b>F 436.-6300</b>	Sample Point <b>SEGMENT-U</b>	Date <b>11-30-89</b>	Time issued <b>8: 8</b>	Priority <b>18</b>
Determination <b>FUSION</b>	Method/Standard <b>LA-549-141</b>	Result Units <b>G/L</b>	Charge Code <b>WB75L</b>	Return <b>0</b>
Sample Size <b>? 200 mL</b>	Customer ID <b>R9070</b>			
Remarks, Calculations, Results: REAGENT BLANK <i>complete</i>				
Analyst -1 <u>6B598/H</u>	Analyst -2	Analyst -3	Analyst -4	Analyst -5 <i>an</i>
Hrs	Hrs	Hrs	Hrs	Hrs
Date <b>3-10-90</b>	Time Completed	Lab Unit Mgr <b>bx</b>		<i>bx</i>
54-6800-061 (R-10-62)				

Total Alpha Analysis on the Fusion Dissolution

Serial No. F 484.-6320	Sample Point SEGMENT-U	Date 11-30-89	Time Issued 8:37	Priority 18
Determination AT	Method/Standard LA-548-101	Result Units uCi/L	Charge Code WB75L	Reruns 0
Sample Size <i>? 10 ml</i>	Customer ID <b>C89072</b>			
Remarks, Calculations, Results: REAGENT BLANK <i>Mary Trant</i> <i>4.60</i> <i>&lt;7.65 mci/l</i> <i>(90)</i>				
Analyst - 1 <i>GC269</i>	Analyst - 2 <i>Mary Trant</i>	Analyst - 3 <i>Hrs</i>	Analyst - 4 <i>Hrs</i>	Analyst - 5 <i>ee</i>
Date <i>3-29-90</i>	Time Completed <i>08</i>	Lab Unit Mgr <i>ee</i>		<i>ee</i>
54-6800-081 (R-10-83)				

Serial No. F 469.-6520	Sample Point SEGMENT-F	Date 11-30-89	Time Issued 8:33	Priority 19
Determination AT	Method/Standard LA-548-101	Result Units % RECOVERY	Charge Code WB75L	Reruns 0
Sample Size <i>? 10 ml</i>	Customer ID <b>C89072</b>			
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID <i>132B44</i>				
Analyst - 1 <i>GC269</i>	Analyst - 2 <i>Mary Trant</i>	Analyst - 3 <i>Hrs</i>	Analyst - 4 <i>Hrs</i>	Analyst - 5 <i>ee</i>
Date <i>3-29-90</i>	Time Completed <i>08</i>	Lab Unit Mgr <i>ee</i>		<i>ee</i>
54-6800-081 (R-10-83)				

Serial No. F 471.-6120	Sample Point SEGMENT-H	Date 11-30-89	Time Issued 8:34	Priority 19
Determination AT	Method/Standard LA-548-101	Result Units uCi/L	Charge Code WB75L	Reruns 0
Sample Size <i>? 100-10-100</i>	Customer ID <b>C89072</b>			
Remarks, Calculations, Results: DUPLICATE SAMPLE <i>&lt;1.76 mci/l</i>				
Analyst - 1 <i>GC269</i>	Analyst - 2 <i>Mary Trant</i>	Analyst - 3 <i>Hrs</i>	Analyst - 4 <i>Hrs</i>	Analyst - 5 <i>ee</i>
Date <i>3-29-90</i>	Time Completed <i>08</i>	Lab Unit Mgr <i>ee</i>		<i>ee</i>
54-6800-081 (R-10-83)				

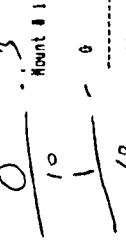
  

Serial No. F 470.-6020	Sample Point SEGMENT-G	Date 11-30-89	Time Issued 8:33	Priority 19
Determination AT	Method/Standard LA-548-101	Result Units uCi/L	Charge Code WB75L	Reruns 0
Sample Size <i>? 100-10-100</i>	Customer ID <b>C89072</b>			
Remarks, Calculations, Results: <i>1.72 mci/l</i>				
Analyst - 1 <i>GC269</i>	Analyst - 2 <i>Mary Trant</i>	Analyst - 3 <i>Hrs</i>	Analyst - 4 <i>Hrs</i>	Analyst - 5 <i>ee</i>
Date <i>3-29-90</i>	Time Completed <i>08</i>	Lab Unit Mgr <i>ee</i>		<i>ee</i>
54-6800-081 (R-10-83)				

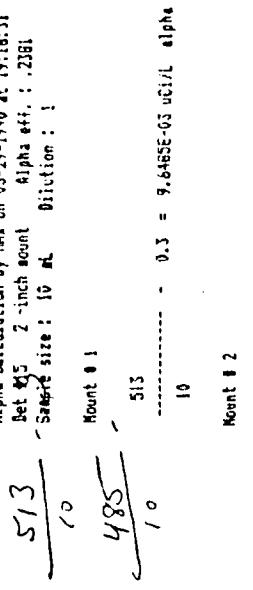
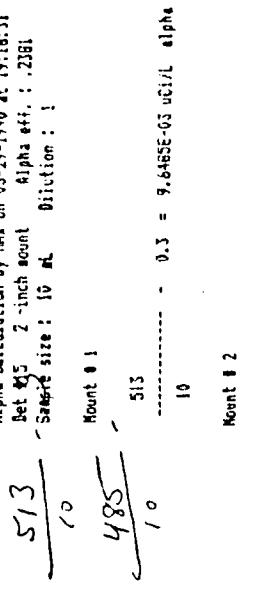
Total Alpha Analysis on the Fusion Dissolution

15/2

Alpha Calculation by MAI on 03-29-1990 at 19:17:55  
Set #15 2-inch mount Alpha eff. : .2381  
Sample size : .10 ml Dilution : 1



Alpha Calculation by MAI on 03-29-1990 at 19:18:31  
Set #15 2-inch mount Alpha eff. : .2381  
Sample size : .10 ml Dilution : 1



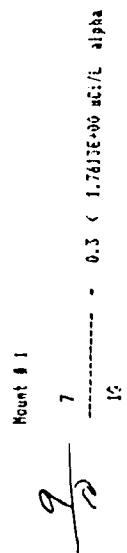
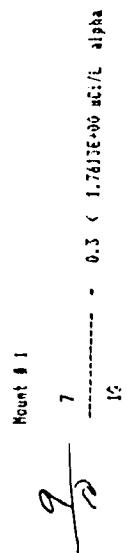
Mount #2  
10  
-----  
0.3 < 7.6349E-05 uCi/l alpha

Mount #2  
10  
-----  
0.3 < 7.6349E-05 uCi/l alpha

F454

15/2

Alpha Calculation by MAI on 03-29-1990 at 17:21:07  
Set #15 2-inch mount Alpha eff. : .2381  
Sample size : .1 ml Dilution : 101



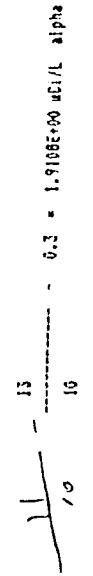
Mount #2  
10  
-----  
0.3 < 1.7611E-06 uCi/l alpha

Mount #2  
10  
-----  
0.3 < 1.7611E-06 uCi/l alpha

F469

15/2

Alpha Calculation by MAI on 03-29-1990 at 19:19:13  
Set #15 2-inch mount Alpha eff. : .2381  
Sample size : .1 ml Dilution : 101



Mount #2  
10  
-----  
0.3 = 9.6465E-05 uCi/l alpha

Mount #2  
10  
-----  
0.3 = 9.6465E-05 uCi/l alpha

F471

F470

Total Alpha Analysis on the Fusion Dissolution

Sample No. F 473 . -6520	Sample Point SEGMENT-J	Date 11-30-89	Time Measured 8:34	Priority 19	Sample No. F 472 . -6220	Sample Point SEGMENT-I	Date 11-30-89	Time Measured 8:34	Priority 19
Determination AT	Method/Standard LA-548-101	Result Units % RECOVERY	Charger Code WB75L	Perme 0	Determination AT	Method/Standard LA-548-101	Result Units % RECOVERY	Charger Code WB75L	Perme 0
Sample Size ? 10 ml					Sample Size ? 100 -10 -100				
Comments, Calculations, Results: LMCS CHECK SAMPLE LMCS ID 22833  95.40%									
<del>9.21 / 9.6538 = 3</del> <del>9.97 - 3</del> <del>9.6538 = 3</del>									
Analyte-1 CC269 Mandy Frederick	Analyte-2 Hg	Analyte-3 Hg	Analyte-4 Hg	Analyte-5 Hg	Analyte-1 CC269 Mandy Frederick	Analyte-2 Hg	Analyte-3 Hg	Analyte-4 Hg	Analyte-5 Hg
Date 3-29-90	Time Completed 10:45 AM				Date 3-29-90	Time Completed 10:45 AM			

S-4000-01 (11-10-83)

S-4000-01 (11-10-83)

Total Alpha Analysis on the Fusion Dissolution

15/2

Alpha Calculation by MAI on 05-29-1990 at 17:19:19  
Det 015 2-inch mount Alpha eff. : .2381  
Sample size : 10 mL Dilution : 101

483 ----- 0.3 = 9.089E-05 uCi/L alpha  
10 Mount #1  
497 ----- 0.3 = 9.3458E-05 uCi/L alpha  
10 Mount #2  
497 ----- 0.3 = 9.3458E-05 uCi/L alpha  
10

Alpha Calculation by MAI on 05-29-1990 at 17:20:27  
Det 015 2-inch count Alpha eff. : .2381  
Sample size : .1 mL Dilution : 101

537 ----- 0.3 = 1.024E+02 uCi/L alpha  
10 Mount #1  
537 ----- 0.3 = 1.024E+02 uCi/L alpha  
10 Mount #2  
537 ----- 0.3 = 1.024E+02 uCi/L alpha  
10

F472

F473

Total Beta Analysis on the Fusion Dissolution

546				
Serial No. F 484.-6325		Sample Point SEGMENT-U	Date 11-30-89	Time Issued 8:37
Determination TB	Method/Standard LA-548-101	Result Units uCi/L	Charge Code WB75L	Reruns 0
Sample Size ? 10ml		Customer ID 089072		
Remarks, Calculations, Results: REAGENT BLANK $\frac{N_2O}{H_2O}$ Count on 13, 14 or 15				
$4.40^{-4}$ <i>meifl</i>				
Analyst - 1 <i>GC269</i>	Analyst - 2 <i>Mary</i>	Analyst - 3 <i>Strong</i>	Analyst - 4 <i>Hrs</i>	Analyst - 5 <i>se</i>
Date 3-28-90	Time Completed	Lab Unit Mgr <i>QP</i>	<i>Xp</i>	
84-8800-081 (R-10-63)				

14-v				
Serial No. F 469.-6325		Sample Point SEGMENT-F	Date 11-30-89	Time Issued 8:33
Determination TB	Method/Standard LA-548-101	Result Units % RECOVERY	Charge Code WB75L	Reruns 0
Sample Size ? 10ml		Customer ID 089072		
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID <u>132844</u> Count on 13, 14 or 15				
$1.314^{-1}$ $1.3022^{-1}$ $100.90\%$				
Analyst - 1 <i>GC269</i>	Analyst - 2 <i>Mary</i>	Analyst - 3 <i>Strong</i>	Analyst - 4 <i>Hrs</i>	Analyst - 5 <i>se</i>
Date 3-28-90	Time Completed	Lab Unit Mgr <i>QP</i>	<i>Xp</i>	
84-8800-081 (R-10-63)				

34				
Serial No. F 471.-6125		Sample Point SEGMENT-H	Date 11-30-89	Time Issued 8:34
Determination TB	Method/Standard LA-548-101	Result Units uCi/L	Charge Code WB75L	Reruns 0
Sample Size ? 100-10-100		Customer ID 089072		
Remarks, Calculations, Results: DUPLICATE SAMPLE Count on 13, 14 or 15				
$6.96^3$ <i>meifl</i>				
Analyst - 1 <i>GC269</i>	Analyst - 2 <i>Mary</i>	Analyst - 3 <i>Strong</i>	Analyst - 4 <i>Hrs</i>	Analyst - 5 <i>se</i>
Date 3-28-90	Time Completed	Lab Unit Mgr <i>QP</i>	<i>Xp</i>	
84-8800-081 (R-10-63)				

34				
Serial No. F 470.-6025		Sample Point SEGMENT-G	Date 11-30-89	Time Issued 8:33
Determination TB	Method/Standard LA-548-101	Result Units uCi/L	Charge Code WB73L	Reruns 0
Sample Size ? 100-10-100		Customer ID 089072		
Remarks, Calculations, Results: Count on 13, 14 or 15				
$5.91^3$ <i>meifl</i>				
Analyst - 1 <i>GC269</i>	Analyst - 2 <i>Mary</i>	Analyst - 3 <i>Strong</i>	Analyst - 4 <i>Hrs</i>	Analyst - 5 <i>se</i>
Date 3-28-90	Time Completed	Lab Unit Mgr <i>QP</i>	<i>Xp</i>	
84-8800-081 (R-10-63)				

Total Beta Analysis on the Fusion Dissolution

3-27-4

3-27-4  
15%

$$\frac{91}{10} - \text{Beta Calculation by NAI on 03-29-1990 at 15:17:53}$$

Bet 415 2-inch count Beta eff. : .3173  
Sample size : 10 ml Dilution : 1  
62  
Mount # 1

$$91$$

----- 6.0 = 4.4009E-04 uCi/L beta  
10

Mount # 2

$$62$$

----- 6.0 = 2.8712E-04 uCi/L beta  
10

F454

15%

$$\frac{48936}{10} - \text{Beta Calculation by NAI on 03-29-1990 at 17:21:45}$$

Bet 413 2-inch count Beta eff. : .3173  
Sample size : .1 ml Dilution : 100  
48936

$$48936$$

----- 6.0 = 7.6980E+03 uCi/L beta  
10

Mount # 2

$$48722$$

----- 6.0 = 6.9056E+03 uCi/L beta  
10

$$\frac{9677}{10} - \text{Beta Calculation by NAI on 03-29-1990 at 19:18:29}$$

Bet 415 2-inch count Beta eff. : .3173  
Sample size : 10 ml Dilution : 1  
8960  
Mount # 1

$$9677$$

----- 6.0 = 1.3455E-01 uCi/L beta  
10

Mount # 2

$$8950$$

----- 6.0 = 1.2635E-01 uCi/L beta  
10

F469

3-29-4

$$\frac{41896}{10} - \text{Beta Calculation by NAI on 03-29-1990 at 17:19:11}$$

Bet 413 2-inch count Beta eff. : .3173  
Sample size : .1 ml Dilution : 100  
41896  
Mount # 1

$$41896$$

----- 6.0 = 5.3988E+03 uCi/L beta  
10

Mount # 2

$$46630$$

----- 6.0 = 5.8128E+03 uCi/L beta  
10

F470

F471

Total Beta Analysis on the Fusion Dissolution

Serial No. F 473.-6525	Sample Point SEGMENT-J	Date 11-30-89	Time issued 8:34	Priority 19
Determination TB	Method/Standard LA-548-101	Result Units % RECOVERY	Charge Code WB75L	Rerun 0
Sample Size ? 10 ml		Customer ID C89072		
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID 132844 Count on 13, 14 or 15				
$\frac{1.296^{-1}}{1.3022^{-1}} \times 100 = 99.5\%$				
Analyst - 1 LC269	Analyst - 2 mccoy	Analyst - 3 trang	Analyst - 4	Analyst - 5 arc
Hrs 3-29-90	Hrs	Hrs	Hrs	Hrs
Date 3-29-90	Time Completed	Lab Unit Mgr SP		

54-6800-061 (R-10-83)

Serial No. F 472.-6225	Sample Point SEGMENT-I	Date 11-30-89	Time issued 8:34	Priority 19
Determination TB	Method/Standard LA-548-101	Result Units % RECOVERY	Charge Code WB75L	Rerun 0
Sample Size ? 100-10-100		Customer ID (F 410) C89072		
Remarks, Calculations, Results: SPIKE SAMPLE SPIKE ID 132844 Count on 13, 14 or 15 SPIKE VOLUME 10 ml				
$\frac{2.385^{-1}}{1.416^{-1}} \times 100 = 112.1\%$				
Analyst - 1 LC269	Analyst - 2 mccoy	Analyst - 3 trang	Analyst - 4	Analyst - 5 arc
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-29-90	Time Completed	Lab Unit Mgr SP		

54-6800-061 (R-10-83)

Total Beta Analysis on the Fusion Dissolution

15/2

9343

Beta Calculation by MAI on 03-29-1970 at 17:19:17  
 Det #13 2 -inch count Beta eff. : .5173  
 Sample size : 10 ml Dilution : 1

Mount #1

9043 ----- - 6.0 = 1.3178E-01 uCi/L beta  
 10

Mount #2

9341 ----- - 6.0 = 1.2755E-01 uCi/L beta  
 10

15/2

51570 ----- - Beta Calculation by MAI on 03-29-1970 at 17:20:23  
 Det #13 2 -inch count Beta eff. : .5173  
 Sample size : .1 ml Dilution : 10

Mount #1

51567 ----- - 6.0 = 7.3857E+03 uCi/L beta  
 10

Mount #2

51567 ----- - 6.0 = 7.3857E+03 uCi/L beta  
 10

F473

F472

Gamma Energy Analysis on the Fusion Dissolution

1071					1070						
Serial No. F 436.-6330	Sample Point SEGMENT-U	Date 11-30-89	Time Issued 8: 9	Priority 18	Serial No. F 421.-6530	Sample Point SEGMENT-F	Date 11-30-89	Time Issued 8: 5	Priority 19		
Determination GEA	Method/Standard LA-548-121	Result Units uCi/L	Charge Code WB75L	Renew 0	Determination GEA	Method/Standard LA-548-121	Result Units % RECOVERY	Charge Code WB75L	Renew 0		
Sample Size ? 1mL					Customer ID <b>689070</b>	Sample Size ? 500x Li <sup>001</sup> 2					Customer ID <b>689070</b>
Remarks, Calculations, Results: REAGENT BLANK					Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID <u>122894</u>						
$\text{Co}^{60} < 3.73^{\text{'}} \text{ neil}$					$\text{Co}^{60} 2.14^{\text{'}} / 2.0933^{\text{'}} 102.2\%$						
$\text{Cs}^{137} < 481^{\text{'}} \text{ neil}$					$\text{Co}^{60} 2.85^{\text{'}} / 2.9979^{\text{'}} 98.3\%$						
Analyst - 1 <u>68598KH</u>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <u>911</u>	Analyst - 1 <u>68598KH</u>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <u>911</u>		
Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs		
Date 3-14-90	Time Completed	Lab Unit Mgr <u>QP</u>	Bm S		Date 3-14-90	Time Completed	Lab Unit Mgr <u>QP</u>	Bm S			

54-6800-061 (R-10-63)

1079					1077						
Serial No. F 471.-6130	Sample Point SEGMENT-H	Date 11-30-89	Time Issued 8:34	Priority 19	Serial No. F 470.-6030	Sample Point SEGMENT-G	Date 11-30-89	Time Issued 8:34	Priority 19		
Determination GEA	Method/Standard LA-548-121	Result Units uCi/L	Charge Code WB75L	Renew 0	Determination GEA	Method/Standard LA-548-121	Result Units uCi/L	Charge Code WB75L	Renew 0		
Sample Size ? 251					Customer ID <b>689072</b>	Sample Size ? 251					Customer ID <b>689072</b>
Remarks, Calculations, Results: DUPLICATE SAMPLE					Remarks, Calculations, Results: $\text{Co}^{60} < 1.21 \text{ neil}$						
$\text{Co}^{60} < 1.49 \text{ neil}$					$\text{Co}^{60} < 1.21 \text{ neil}$						
$\text{Cs}^{137} 7.87^{\text{'}} \text{ neil}$					$\text{Cs}^{137} 6.79^{\text{'}} \text{ neil}$						
Analyst - 1 <u>68598KH</u>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <u>911</u>	Analyst - 1 <u>68598KH</u>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <u>911</u>		
Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs		
Date 3-14-90	Time Completed	Lab Unit Mgr <u>QP</u>	Bm S		Date 3-14-90	Time Completed	Lab Unit Mgr <u>QP</u>	Bm S			

54-6800-061 (R-10-63)

Gamma Energy Analysis on the Fusion Dissolution

1087					1084				
Serial No. F 569.-6530	Sample Point SEGMENT-J	Date 12- 1-89	Time Issued 11:35	Priority 19	Serial No. F 568.-6230	Sample Point SEGMENT-I	Date 12- 1-89	Time Issued 11:35	Priority 19
Determination GEA	Method/Standard LA-548-121	Result Units % RECOVERY	Charge Code WB75L	ReRun 0	Determination GEA	Method/Standard LA-548-121	Result Units % RECOVERY	Charge Code WB75L	ReRun 0
Sample Size ? 500	Customer ID <b>089076</b>				Sample Size ? 501	Customer ID <b>089076</b>			
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID 122844					Remarks, Calculations, Results: SPIKE SAMPLE F 447 SPIKE ID 122944 SPIKE VOLUME 3.80 93.5%				
$C_{60}^{60} \frac{2.07}{2.0932} = 98.9\%$					$2.04 - 1.85 = 13.55 \times 2 = 2.71$ <del><math>\frac{4.08^2}{1.37^2} = 2.71</math></del>				
$C_{51}^{51} \frac{2.82}{2.8979} = 97.39\%$									
Analyst - 1 <i>68598/171</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>ONE</i>	Analyst - 1 <i>68598/171</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>ONE</i>
Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-14-90	Time Completed	Lab Unit Mgr <i>CRP</i>	Comments <i>DM S</i>		Date 3-14-90	Time Completed	Lab Unit Mgr <i>CRP</i>	Comments <i>DM S</i>	
54-6800-081 (R-10-53)					54-6800-081 (R-10-53)				

## Uranium Analysis on the Fusion Dissolution

Serial No. F 484.-6340	Sample Point SEGMENT-U	Date 11-30-89	Time issued 8:38	Priority 18
Determination U	Method/Standard LA-925-106	Result Units G/L	Charge Code WB75L	Permit No. 0
Sample Size ? 50L				Customer ID C89072
Remarks, Calculations, Results:				
REAGENT BLANK F 748 $\text{Spk IV/Vol} = \frac{51838}{5.625 \cdot 4}$ over 1.02 $\text{Spk Vol: } 100\text{L}$ 0.000 $\frac{(0.2)(5.625 \cdot 4)(1)(20) \cancel{ml}}{0.320 - 0.02} = \underline{\underline{7.49 \cdot 5}}$ <del>single</del>				
Analyst - 1 Sue Lin	Analyst - 2	Analyst - 3	Analyst - 4 <i>S. Mathes</i>	Analyst - 5
Hrs 6.916	Hrs	Hrs	Hrs	Hrs
Date 1-22-90	Time Completed	Lab Unit Mgr		

Serial No. <b>F 469.-6540</b>	Sample Point <b>SEGMENT-F</b>	Date <b>11-30-89</b>	Time Issued <b>8:33</b>	Priority <b>23</b>
Determination <b>U</b>	Method/Standard <b>LA-925-106</b>	Result Units <b>% RECOVERY</b>	Charge Code <b>WB75L</b>	Return <b>0</b>
Sample Size <b>? 100-10-100</b>				Customer ID <b>089072</b>
Remarks, Calculations, Results: <b>LMCS CHECK SAMPLE</b> <b>LMCS ID 54838</b> spike ID/vol: 54838 (44) SEE Reverse o. 190 Side 44 $5.62 \cdot 4$ o. 610 spike vol: 100 x $(.190)(5.62e^{-4})(.1)(100)$ = 2.57E-2 $5.610 - .190$ 2.57E-2 <b>Analyst - 1</b> <i>Sue Lai</i> hrs $6:916$ <b>Analyst - 2</b> hrs <b>Analyst - 3</b> hrs <b>Analyst - 4</b> hrs <b>Analyst - 5</b> <i>Maths</i> <i>James Sulf</i> <b>Date</b> <b>6-32-90</b> <b>Time Completed</b> <b>Lab Unit Mgr</b>				

Serial No. <b>F 471.-6140</b>	Sample Point <b>SEGMENT-H</b>	Date <b>11-30-89</b>	Time Issued <b>8:34</b>	Priority <b>23</b>
Determination <b>U</b>	Method/Standard <b>LA-925-106</b>	Result Units <b>G/L</b>	Charge Code <b>WB75L</b>	Recur <b>0</b>
Sample Sub <b>? 100 -10 -100</b>				Customer ID <b>C89072</b>
Remarks, Calculations, Results: <b>DUPLICATE SAMPLE</b> SPike : 54B3P SEE Reverse Side $\text{Spike : } 54B3P \quad \text{SEE Reverse Side}$ $5.13^{-4}$ $100 \lambda \quad \frac{(140)(5.62 \times 10^{-4})}{(100)} = 2.39 \times 10^{-2}$ $870 - 160$ $0.160$ $0.540$ $2.39 \times 10^{-2}$ $870 - 160$				
Analyst - 1 <b>Sue Lai</b>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <b>R. Hattie</b>
Hrs <b>6:916</b>	Hrs	Hrs	Hrs	Hrs
Date <b>6-22-90</b>	Time Completed	Lab Unit Mgr		

Serial No. F 470.-6040	Sample Point SEGMENT-G	Date 11-30-89	Time Issued 8:34	Priority 23
Determination U	Method/Standard LA-925-106	Result Units G/L	Charge Code WB75L	Permit # 0
Sample Size ? 100-10-100			Customer # 089072	
Remarks, Calculations, Results:				
<p>spike : <math>5.62 \times 4</math>  <del>54838</del> See Reverse Side <math>\alpha 145</math></p> <p><math>100 \lambda</math> <math>\alpha 525</math></p> <p><math>(\text{C} \circlearrowleft) \frac{(145)(5.62 \times 4)}{4525 - 145} = 2.17 \times 10^{-2}</math></p>				
Analyst - 1 <i>Sue Lai</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>R. Blatt</i>
Mrs 6c 916	Mrs	Mrs	Mrs	Mrs
Date 1-22-90	Time Computed	Lab Unit Mgr		

## Uranium Analysis of the Fusion Dissolution

$$\begin{aligned} & \text{FO469.-6540} \\ & \frac{(1.90)(5.625 \cdot 10^{-4})(1.010)}{\left(\frac{5.6}{2.0}(1.61) - 1.95\right)} = 2.50 \cdot 10^{-2} \\ & \text{FO470-6040} \\ & \frac{\left(\frac{1.145}{2}\right)\left(\frac{5.625 \cdot 10^{-4}}{2}\right)(1.010)}{\left(\frac{5.6}{2.0}(5.25) - 1.95\right)} = 2.11 \cdot 10^{-2} \end{aligned}$$

$$\frac{.16(5.62E-4)(.1)(.10)}{(.152)(.54) - .16} = \frac{2.33E-4}{2.33E-4} = .02$$

FO471. -6140

FO471.-6140  
~~2.33x0-251n~~  
2.33x0-251n  
M.Cats

Uranium Analysis on the Fusion Dissolution

Serial No.	Sample Point		Date	Time Issued	Priority
F 472.-6240	SEGMENT-I		11-30-89	8:34	23
Determination	Method/Standard	Result Units	Charge Code	Reruns	
U	LA-925-106	% RECOVERY	WB75L	0	
Sample Size	100λ sample ? 100λ CTD > 10 ml water → 100λ		Customer ID		
			C89072		
Remarks, Calculations, Results: SPIKE SAMPLE SPIKE ID <u>54838</u> SPIKE VOLUME <u>100λ</u> 0.330					
$\frac{.33(5.62E^{-1})(1020)}{((\frac{.57}{.56})(645) - .33)} = 5.7962 \text{ g/L} \quad 0.645$ $5.7962 \text{ g/L} - 2.11 \text{ g/L} = 3.68E-2 / 2.99E-2$					
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
Sue Lai				<u>J. H. Clegg</u>	
Hrs	Hrs	Hrs	Hrs	Hrs	
6c 916					
Date	Time Completed	Lab Unit Mgr			
6-22-90					
84-6000-061 (R-10-43)					

Serial No.	Sample Point		Date	Time Issued	Priority
F 473.-6540	SEGMENT-J		11-30-89	8:34	23
Determination	Method/Standard	Result Units	Charge Code	Reruns	
U	LA-925-106	% RECOVERY	WB75L	0	
Sample Size	? 100 - 10 - 100		Customer ID		
			C89072		
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID <u>54838</u> See Reverse Side					
$\text{spike ID/val: } 54838 \quad 0.195 \text{ (QD)}$ $\cdot 62^{-4} \quad 0.120 \text{ (7.6% QD)}$ <del><math display="block">\text{spike val/100λ} \quad (\cdot 195)(5.62E^{-1})(1)(1020) = 2.12E-2</math></del> <del><math display="block">\cdot 620 = 195 \quad 2.12E-2</math></del> $2.12E-2 \rightarrow 2.99E-2$					
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
Sue Lai				<u>J. H. Clegg</u>	
Hrs	Hrs	Hrs	Hrs	Hrs	
6c 916					
Date	Time Completed	Lab Unit Mgr			
6-22-90					
84-6000-061 (R-10-43)					

Uranium Analysis on the Fusion Dissolution

$$\frac{(1.08)(5.62 \text{ F-24})(1.1)(1010)}{\left( \left( \frac{1.51}{2.52} \right) (1.020) \right) - .195} = 2.54 \text{ F-24}$$

~~1.08~~ 85.0%

Water Digestion

Serial No. F 476.-7100	Sample Point SEGMENT-M	Date 11-30-89	Time Issued 8:35	Priority 19
Determination H <sub>2</sub> O-DGST	Method/Standard LA-504-101	Result Units G/L	Charge Code WB75L	Reruns 0
Sample Size ?	Customer ID			
Remarks, Calculations, Results: <b>DUPLICATE ANALYSIS</b> GRAMS SAMPLE <u>.5003</u> VOLUME ON COMPLETION <u>50ml</u> <u>1.00 -2 g/ml</u>				
Analyst -1 80725/1.C.	Analyst -2 <i>Chemicut</i>	Analyst -3 <i>84171</i>	Analyst -4	Analyst -5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-7-90	Time Completed	Lab Unit Mgr <i>CJW</i>	4 MS	
54-0800-061 (R-10-83)				

Serial No. F 486.-7300	Sample Point SEGMENT-W	Date 11-30-89	Time Issued 8:38	Priority 18
Determination H <sub>2</sub> O-DGST	Method/Standard LA-504-101	Result Units G/L	Charge Code WB75L	Reruns 0
Sample Size ?	Customer ID <b>089072</b>			
Remarks, Calculations, Results: <b>REAGENT BLANK</b> <i>completely</i>				
Analyst -1 80725/1.C.	Analyst -2 <i>Chemicut</i>	Analyst -3 <i>84171</i>	Analyst -4	Analyst -5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-7-90	Time Completed	Lab Unit Mgr <i>CJW</i>	4 MS	
54-0800-061 (R-10-83)				

Serial No. F 477.-7200	Sample Point SEGMENT-N	Date 11-30-89	Time Issued 8:36	Priority 19
Determination H <sub>2</sub> O-DGST	Method/Standard LA-504-101	Result Units % RECOVERY	Charge Code WB75L	Reruns 0
Sample Size ?	Customer ID <b>089072</b>			
Remarks, Calculations, Results: <b>SPIKED ANALYSIS</b> GRAMS SAMPLE <u>.5004</u> VOLUME ON COMPLETION <u>50ml</u> VOLUME SPIKE _____ SPIKE ID _____ <u>1.02 -2 g/ml</u>				
Analyst -1 80725/1.C.	Analyst -2 <i>Chemicut</i>	Analyst -3 <i>84171</i>	Analyst -4	Analyst -5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-7-90	Time Completed	Lab Unit Mgr <i>CJW</i>	4 MS	
54-0800-061 (R-10-83)				

Serial No. F 475.-7000	Sample Point SEGMENT-L	Date 11-30-89	Time Issued 8:35	Priority 19
Determination H <sub>2</sub> O-DGST	Method/Standard LA-504-101	Result Units G/L	Charge Code WB75L	Reruns 0
Sample Size ?	Customer ID <b>89072</b>			
Remarks, Calculations, Results: <b>GRAMS SAMPLE .4886</b> VOLUME ON COMPLETION <u>50ml</u> <i># 361</i> <i># 475</i> <u>9.80 -3 g/ml</u> <i>W/HC</i>				
Analyst -1 80725/1.C.	Analyst -2 <i>Chemicut</i>	Analyst -3 <i>84171</i>	Analyst -4	Analyst -5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-7-90	Time Completed	Lab Unit Mgr <i>CJW</i>	4 MS	
54-0800-061 (R-10-83)				

Ion Chromatograph Analysis on the Water Digestion - Chloride Analysis

Serial No. F 438.-7372	Sample Point SEGMENT-W	Date 11-30-89	Time Issued 8: 9	Priority 18
Determination CL	Method/Standard LA-533-105	Result Units PPM	Charge Code WB75L	Re runs 0
Sample Size ? Direct	Customer ID <b>089070</b>			
Remarks, Calculations, Results: REAGENT BLANK				
<i>.202 ppm</i>				
Analyst - 1 46107/reu	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 08241171
Hrs .5	Hrs	Hrs	Hrs	Hrs
Date 4/5/90	Time Completed	Lab Unit Mgr AP	<i>[Signature]</i>	
54-6800-081 (R-10-83)				

Serial No. F 426.-7572	Sample Point SEGMENT-K	Date 11-30-89	Time Issued 8: 7	Priority 19
Determination CL	Method/Standard LA-533-105	Result Units % RECOVERY	Charge Code WB75L	Re runs 0
Sample Size 100-10	Customer ID <b>089070</b>			
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID <u>AC1170</u>				
<i>KT 71.81 / 72.00      99.7%</i>				
Analyst - 1 46107/reu	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 08241171
Hrs .5	Hrs	Hrs	Hrs	Hrs
Date 4/5/90	Time Completed	Lab Unit Mgr AP	<i>[Signature]</i>	
54-6800-081 (R-10-83)				

Serial No. F 476.-7172	Sample Point SEGMENT-M	Date 11-30-89	Time Issued 8:36	Priority 19
Determination CL	Method/Standard LA-533-105	Result Units PPM	Charge Code WB75L	Re runs 0
Sample Size ? 100-10	Customer ID <b>089072</b>			
Remarks, Calculations, Results: DUPLICATE SAMPLE				
<i>1.65 ppm</i>				
Analyst - 1 46107/reu	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 08241171
Hrs .5	Hrs	Hrs	Hrs	Hrs
Date 4/5/90	Time Completed	Lab Unit Mgr AP	<i>[Signature]</i>	
54-6800-081 (R-10-83)				

Serial No. F 475.-7072	Sample Point SEGMENT-L	Date 11-30-89	Time Issued 8:35	Priority 19
Determination CL	Method/Standard LA-533-105	Result Units PPM	Charge Code WB75L	Re runs 0
Sample Size ? 100-10	Customer ID <b>089072</b>			
Remarks, Calculations, Results:				
<i>&lt;1.01 ppm</i>				
Analyst - 1 46107/reu	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 08241171
Hrs .5	Hrs	Hrs	Hrs	Hrs
Date 4/5/90	Time Completed	Lab Unit Mgr AP	<i>[Signature]</i>	
54-6800-081 (R-10-83)				

Ion Chromatograph Analysis on the Water Digestion - Chloride Analysis

Serial No. <b>F 574.-7572</b>	Sample Point <b>SEGMENT-O</b>	Date <b>12- 1-89</b>	Time Issued <b>11:36</b>	Priority <b>19</b>
Determination <b>CL</b>	Method/Standard <b>LA-533-105</b>	Result Units <b>% RECOVERY</b>	Charge Code <b>WB75L</b>	Runno <b>0</b>
Sample Size <b>100-10</b>			Customer ID <b>089076</b>	
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID <u>EC1140</u>				
$\frac{70.21}{72.0} \times 100 = 97.5\%$				
Analyst - 1 <u>68107/nr4</u>	Analyst - 2 <u>.5</u>	Analyst - 3 <u>hrs</u>	Analyst - 4 <u>hrs</u>	Analyst - 5 <u>hrs</u>
Date <b>4/5/90</b>	Time Completed <u>08</u>	Lab Unit Mgr <u>KP</u>		

84-4800-081 (R-10-83)

Serial No. <b>F 429.-7272</b>	Sample Point <b>SEGMENT-N</b>	Date <b>11-30-89</b>	Time Issued <b>8: 8</b>	Priority <b>19</b>
Determination <b>CL</b>	Method/Standard <b>LA-533-105</b>	Result Units <b>% RECOVERY</b>	Charge Code <b>WB75L</b>	Runno <b>0</b>
Sample Size <b>? 100-10</b>			Customer ID <b>GES:..</b>	
Remarks, Calculations, Results: SPIKE SAMPLE SPIKE ID <u>35C9-77</u> SPIKE VOLUME, <u>300/5ml</u>				
$\frac{4.348^2 - 17.0}{434.5} \times 100 = 103.9\%$				
Analyst - 1 <u>68107/nr4</u>	Analyst - 2 <u>.5</u>	Analyst - 3 <u>hrs</u>	Analyst - 4 <u>hrs</u>	Analyst - 5 <u>hrs</u>
Date <b>4/5/90</b>	Time Completed <u>08</u>	Lab Unit Mgr <u>KP</u>		

84-4800-081 (R-10-83)

*See Reverse Side*

Ion Chromatograph Analysis on the Water Digestion - Chloride Analysis

c1

$$\frac{(6.00)(435) - (17.6)(\frac{9.74\%}{10.39})}{(\frac{1.300)(7.6)}{5.3}) (1.01)} \times 100 = \\ = 102.4\%$$

*J. Schmandt*  
8-23-90

F 4229-7772

Ion Chromatograph Analysis on the Water Digestion - Nitrate Analysis

Serial No. F 438.-7373		Sample Point SEGMENT-W		Date 11-30-89	Time Issued 8: 9	Priority 18
Determination NO3	Method/Standard LA-533-105	Result Units PPM	Charge Code WB75L	Retrun 0		
Sample Size ? Direct		Customer ID <b>689070</b>				
Remarks, Calculations, Results: REAGENT BLANK						
<i>&lt;1 ppm</i>						
Analyst - 1 <i>68107/rew</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>68107/1110</i>		
Hrs .5	Hrs	Hrs	Hrs	Hrs		
Date 4/5/90	Time Completed	Lab Unit Mgr <i>AP</i>	<i>AP</i>	<i>AP</i>		
54-6800-081 (R-10-63)						

Serial No. F 426.-7573		Sample Point SEGMENT-K		Date 11-30-89	Time Issued 8: 7	Priority 19
Determination NO3	Method/Standard LA-533-105	Result Units % RECOVERY	Charge Code WB75L	Retrun 0		
Sample Size 100-10		Customer ID <b>689070</b>				
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID <i>68107/1110</i>						
<i>101.9%</i>						
Analyst - 1 <i>68107/rew</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>68107/1110</i>		
Hrs .5	Hrs	Hrs	Hrs	Hrs		
Date 4/5/90	Time Completed	Lab Unit Mgr <i>AP</i>	<i>AP</i>	<i>AP</i>		
54-6800-081 (R-10-63)						

Serial No. F 476.-7173		Sample Point SEGMENT-M		Date 11-30-89	Time Issued 8:36	Priority 19
Determination NO3	Method/Standard LA-533-105	Result Units PPM	Charge Code WB75L	Retrun 0		
Sample Size ? 100-10		Customer ID <b>689072</b>				
Remarks, Calculations, Results: DUPLICATE SAMPLE						
<i>4.70<sup>2</sup> ppm</i>						
Analyst - 1 <i>68107/rew</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>68107/1110</i>		
Hrs .5	Hrs	Hrs	Hrs	Hrs		
Date 4/5/90	Time Completed	Lab Unit Mgr <i>AP</i>	<i>AP</i>	<i>AP</i>		
54-6800-081 (R-10-63)						

Serial No. F 475.-7073		Sample Point SEGMENT-L		Date 11-30-89	Time Issued 8:35	Priority 19
Determination NO3	Method/Standard LA-533-105	Result Units PPM	Charge Code WB75L	Retrun 0		
Sample Size ? 100-10		Customer ID <b>689072</b>				
Remarks, Calculations, Results:						
<i>5.98<sup>2</sup></i>						
Analyst - 1 <i>68107/rew</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>68107/1110</i>		
Hrs .5	Hrs	Hrs	Hrs	Hrs		
Date 4/5/90	Time Completed	Lab Unit Mgr <i>AP</i>	<i>AP</i>	<i>AP</i>		
54-6800-081 (R-10-63)						

Ion Chromatograph Analysis on the Water Digestion - Nitrate Analysis

Serial No.	Sample Point		Date	Time Issued	Priority
F 429.-7273	SEGMENT-N		11-30-89	8: 8	19
Determination	Method/Standard	Result Units	Charge Code	Rerun	
N03	LA-533-105	% RECOVERY	WB75L	0	
Sample Size			Customer ID		
? 100-10			089070		
Remarks, Calculations, Results:					
SPIKE SAMPLE SPIKE ID <u>35C9-77</u> SPIKE VOLUME <u>.300/5mL</u>					
<i>See Reverse Side</i> → $\frac{1.87 \left[ (3.84^3 - 3.03^3) \right]}{3493.1} \times 100 = 109.4\%$ <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; display: inline-block;">AP</span>					
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
(68107/RW4)				<u>089071/21</u>	
Hrs	Hrs	Hrs	Hrs	Hrs	
5					
Date	Time Completed		Lab Unit Mgr		
4/5/90	AP		107		
84-6000-081 (P-10-83)					

Serial No.	Sample Point		Date	Time Issued	Priority
F 574.-7573	SEGMENT-O		12- 1-89	11:37	19
Determination	Method/Standard	Result Units	Charge Code	Rerun	
N03	LA-533-105	% RECOVERY	WB75L	0	
Sample Size			Customer ID		
100-10			089076		
Remarks, Calculations, Results:					
LMCS CHECK SAMPLE LMCS ID <u>6C11A0</u>					
$\frac{615.4}{599} \times 100 = 102.7\%$					
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
(68107/RW4)				<u>089072/21</u>	
Hrs	Hrs	Hrs	Hrs	Hrs	
5					
Date	Time Completed		Lab Unit Mgr		
4/5/90	AP		107		
84-6000-081 (P-10-83)					

Ion Chromatograph Analysis on the Water Digestion - Nitrate Analysis

$\text{NO}_3$

$$\frac{(1.06)(3840) - (303)(\frac{9.746}{10.39})}{300(1611)} \times 100 = \\ = 108.4\%$$

*John Doe*  
8-23-90

F 429.-7273

Ion Chromatograph Analysis on the Water Digestion - Phosphate Analysis

Serial No. <b>F 438.-7374</b>	Sample Point <b>SEGMENT-W</b>		Date <b>11-30-89</b>	Time Issued <b>8: 9</b>	Priority <b>18</b>
Determination <b>P04</b>	Method/Standard <b>LA-533-105</b>	Result Units <b>PPM</b>	Charge Code <b>WB75L</b>	Runno <b>0</b>	
Sample Size ? Direct		Customer ID <b>689070</b>			
Remarks, Calculations, Results: REAGENT BLANK					
$\leq 1$ ppm					
Analyst - 1 <i>46107/new</i>	Analyst - 2 Hrs .5	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 <i>46107/X1171</i>	
Date <b>4/5/90</b>	Time Completed <i>OP</i>	Lab Unit Mgr <i>bk</i>			
54-0000-081 (R-10-63)					

Serial No. <b>F 426.-7574</b>	Sample Point <b>SEGMENT-K</b>		Date <b>11-30-89</b>	Time Issued <b>8: 7</b>	Priority <b>19</b>
Determination <b>P04</b>	Method/Standard <b>LA-533-105</b>	Result Units <b>% RECOVERY</b>	Charge Code <b>WB75L</b>	Runno <b>0</b>	
Sample Size <b>100-10</b>		Customer ID <b>689070</b>			
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID <i>6C1710</i>					
$603.8 / 599$					
Analyst - 1 <i>46107/new</i>	Analyst - 2 Hrs .5	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 <i>46107/X1171</i>	
Date <b>4/5/90</b>	Time Completed <i>OP</i>	Lab Unit Mgr <i>bk</i>			
54-0000-081 (R-10-63)					

Serial No. <b>F 476.-7174</b>	Sample Point <b>SEGMENT-M</b>		Date <b>11-30-89</b>	Time Issued <b>8:36</b>	Priority <b>19</b>
Determination <b>P04</b>	Method/Standard <b>LA-533-105</b>	Result Units <b>PPM</b>	Charge Code <b>WB75L</b>	Runno <b>0</b>	
Sample Size ? 100-10		Customer ID <b>689072</b>			
Remarks, Calculations, Results: DUPLICATE SAMPLE					
$\leq 1.01^2$ ppm					
Analyst - 1 <i>46107/new</i>	Analyst - 2 Hrs .5	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 <i>46107</i>	
Date <b>4/5/90</b>	Time Completed <i>OP</i>	Lab Unit Mgr <i>bk</i>			
54-0000-081 (R-10-63)					

Serial No. <b>F 475.-7074</b>	Sample Point <b>SEGMENT-L</b>		Date <b>11-30-89</b>	Time Issued <b>8:35</b>	Priority <b>19</b>
Determination <b>P04</b>	Method/Standard <b>LA-533-105</b>	Result Units <b>PPM</b>	Charge Code <b>WB75L</b>	Runno <b>0</b>	
Sample Size ? 100-10		Customer ID <b>689072</b>			
Remarks, Calculations, Results:					
$\leq 1.01^2$ ppm					
Analyst - 1 <i>46107/new</i>	Analyst - 2 Hrs .5	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 <i>46107</i>	
Date <b>4/5/90</b>	Time Completed <i>OP</i>	Lab Unit Mgr <i>bk</i>			
54-0000-081 (R-10-63)					

Ion Chromatograph Analysis on the Water Digestion - Phosphate Analysis

Serial No.	Sample Point		Date	Time Issued	Priority
F 574.-7574	SEGMENT-0		12- 1-89	11:37	19
Determination	Method/Standard	Result Units	Charge Code	Reruns	
P04	LA-533-105	% RECOVERY	WB75L	0	
Sample Size			Customer ID		
100-10			089076		
Remarks, Calculations, Results:					
<p>LMCS CHECK SAMPLE LMCS ID <u>6C1140</u></p> <p style="text-align: center;">4P</p> <p style="text-align: center;">607.9 / 599      101.5%</p>					
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
<u>63107/NEW</u>			<u>QD</u>	<u>QD</u>	
Hrs	Hrs	Hrs	Hrs	Hrs	
.5					
Date	Time Completed	Lab Unit Mgr			
4/5/90		<u>QP</u>	<u>QD</u>	<u>QD</u>	
54-8800-081 (R-10-83)					

Serial No.	Sample Point		Date	Time Issued	Priority
F 429.-7274	SEGMENT-N		11-30-89	8:8	19
Determination	Method/Standard	Result Units	Charge Code	Reruns	
P04	LA-533-105	% RECOVERY	WB75L	0	
Sample Size			Customer ID		
? 100-10			089070		
Remarks, Calculations, Results:					
<p>SPIKE SAMPLE SPIKE ID <u>3529-77</u> SPIKE VOLUME <u>300/5 ml</u></p> <p style="text-align: center;">See Reverse Side</p> <p style="text-align: center;"><u>1.07 (3.452<sup>3</sup>)</u>      <u>4P</u> <u>3464.5</u>      <u>x100 = 101.576</u></p>					
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
<u>63107/NEW</u>			<u>QD</u>	<u>QD</u>	
Hrs	Hrs	Hrs	Hrs	Hrs	
.5					
Date	Time Completed	Lab Unit Mgr			
4/5/90		<u>QP</u>	<u>QD</u>	<u>QD</u>	
54-8800-081 (R-10-83)					

Ion Chromatograph Analysis on the Water Digestion - Phosphate Analysis

Po<sub>4</sub>

$$\frac{(1.06)(5450) - 0}{(300)(606)} \times 100 = 1036\%$$

*J. Schmitz*  
8-23-90

F 429-7774

Ion Chromatograph Analysis on the Water Digestion - Sulphate Analysis

Serial No. F 438.-7375	Sample Point SEGMENT-W	Date 11-30-89	Time Issued 8: 9	Priority 19
Determination SO4	Method/Standard LA-533-105	Result Units PPM	Charge Code WB75L	Retrun 0
Sample Size ? Direct	Customer ID <b>689070</b>			
Remarks, Calculations, Results: REAGENT BLANK				
<i>&lt;1 ppm</i>				
Analyst - 1 <i>68107/wew</i>	Analyst - 2 Hrs .5	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4/5/90	Time Completed <i>4P</i>	Lab Unit Mgr <i>bj</i>		
54-8800-061 (R-10-83)				

Serial No. F 426.-7575	Sample Point SEGMENT-K	Date 11-30-89	Time Issued 8: 7	Priority 19
Determination SO4	Method/Standard LA-533-105	Result Units % RECOVERY	Charge Code WB75L	Retrun 0
Sample Size 100-10	Customer ID <b>689070</b>			
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID <u>801100</u>				
<i>100.8%</i> <i>620.8 / 622</i>				
Analyst - 1 <i>68107/wew</i>	Analyst - 2 Hrs .5	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4/5/90	Time Completed <i>4P</i>	Lab Unit Mgr <i>bj</i>		
54-8800-061 (R-10-83)				

Serial No. F 476.-7175	Sample Point SEGMENT-M	Date 11-30-89	Time Issued 8:36	Priority 19
Determination SO4	Method/Standard LA-533-105	Result Units PPM	Charge Code WB75L	Retrun 0
Sample Size ? 100-10	Customer ID <b>689072</b>			
Remarks, Calculations, Results: DUPLICATE SAMPLE				
<i>3.56 ppm</i>				
Analyst - 1 <i>68107/wew</i>	Analyst - 2 Hrs .5	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4/5/90	Time Completed <i>4P</i>	Lab Unit Mgr <i>bj</i>		
54-8800-061 (R-10-83)				

Serial No. F 475.-7075	Sample Point SEGMENT-L	Date 11-30-89	Time Issued 8:35	Priority 19
Determination SO4	Method/Standard LA-533-105	Result Units PPM	Charge Code WB75L	Retrun 0
Sample Size ? 100-10	Customer ID <b>689072</b>			
Remarks, Calculations, Results:				
<i>4.08 ppm</i>				
Analyst - 1 <i>68107/wew</i>	Analyst - 2 Hrs .5	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 4/5/90	Time Completed <i>4P</i>	Lab Unit Mgr <i>bj</i>		
54-8800-061 (R-10-83)				

Ion Chromatograph Analysis on the Water Digestion - Sulphate Analysis

Serial No.	Sample Point		Date	Time Issued	Priority
F 574.-7575	SEGMENT-0		12- 1-89	11:37	19
Determination	Method/Standard	Result Units	Charge Code	Return	
SO4	LA-533-105	% RECOVERY	WB75L	0	
Sample Size			Customer ID		
100-10			089076		
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID <u>10C1140</u>					
$\frac{625.2}{622} \quad 100.5\%$					
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
<u>4B107new</u>	Hrs	Hrs	Hrs	<u>4B117</u>	
.5					
Date	Time Completed		Lab Unit Mgr		
4/5/90	<u>4P</u>		<u>4P</u>	<u>4P</u>	
<small>54-5800-061 (R-10-83)</small>					

Serial No.	Sample Point		Date	Time Issued	Priority
F 429.-7275	SEGMENT-N		11-30-89	8: 8	19
Determination	Method/Standard	Result Units	Charge Code	Return	
SO4	LA-533-105	% RECOVERY	WB75L	0	
Sample Size			Customer ID		
? 100+10			089076		
Remarks, Calculations, Results: SPIKE SAMPLE SPIKE ID <u>2559-77</u> SPIKE VOLUME <u>300/5ml</u>					
<del><math display="block">\frac{1.07(3.527^3 - 3.01)}{3355.9}</math></del> <u>100 + 11.5%</u>					
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
<u>4B107/new</u>	Hrs	Hrs	Hrs	<u>4B117</u>	
.5					
Date	Time Completed		Lab Unit Mgr		
4/5/90	<u>4P</u>		<u>4P</u>	<u>4P</u>	
<small>54-5800-061 (R-10-83)</small>					

Ion Chromatograph Analysis on the Water Digestion - Sulphate Analysis

SO<sub>4</sub>

$$\frac{(1.06)(3530) - (30.1)\left(\frac{9.746}{10.37}\right)}{.300(589)} \times 100 = \underline{5.3}$$

$$= 110.3\%$$

*J. G. Schmitz*  
09-23-90

F 429.-7275

Ion Chromatograph Analysis on the Water Digestion - Fluoride Analysis

Serial No. F 475.-7071	Sample Point SEGMENT-L		Date 11-30-89	Time Issued 8:35	Priority 19
Determination F	Method/Standard LA-533-105	Result Units PPM	Charge Code WB75L	Reruns 0	
Sample Size ? 100-10			Customer ID		
Remarks, Calculations, Results:  1.87' 1.865 ppm  RERUN					
Analyst - 1 4B107/reu	Analyst - 2 Hrs .5	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs	
Date 4/12/90	Time Completed 4/14/90	Lab Unit Mgr			

54.5 / 60.0      90.8%

Serial No. F 426.-7571	Sample Point SEGMENT-K		Date 11-30-89	Time Issued 8: 7	Priority 19
Determination F	Method/Standard LA-533-105	Result Units % RECOVERY	Charge Code WB75L	Reruns 0	
Sample Size 100-10			Customer ID		
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID #C11-A0  RERUN					
Analyst - 1 6B107/reu	Analyst - 2 Hrs .5	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs	
Date 4/12/90	Time Completed 4/14/90	Lab Unit Mgr			

54.5 / 60.0      90.8%

Serial No. F 429.-7271	Sample Point SEGMENT-N		Date 11-30-89	Time Issued 8: 8	Priority 19
Determination F	Method/Standard LA-533-105	Result Units % RECOVERY	Charge Code WB75L	Reruns 0	
Sample Size ? 100-10			Customer ID		
Remarks, Calculations, Results: SPIKE SAMPLE SPIKE ID 2529-79 SPIKE VOLUME .5ml See Reverse side RERUN  1.9(2.921 <sup>2</sup> -1.721) 286.13      99  1.9(2.921 <sup>2</sup> -1.721) 286.13      105.08  RERUN					
Analyst - 1 6B107/reu	Analyst - 2 Hrs .5	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs	
Date 4/12/90	Time Completed 4/14/90	Lab Unit Mgr			

1.42'      1.419 ppm

Serial No. F 476.-7171	Sample Point SEGMENT-M		Date 11-30-89	Time Issued 8:36	Priority 19
Determination F	Method/Standard LA-533-105	Result Units PPM	Charge Code WB75L	Reruns 0	
Sample Size ? 100-10			Customer ID		
Remarks, Calculations, Results: DUPLICATE SAMPLE  RERUN					
Analyst - 1 6B107/reu	Analyst - 2 Hrs .5	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs	
Date 4/12/90	Time Completed 4/14/90	Lab Unit Mgr			

54.5 / 60.0      90.8%

Ion Chromatograph Analysis on the Water Digestion - Fluoride Analysis

F 429.

$$\frac{\frac{5.3 \text{ mL}}{3.0 \text{ mL}} \left( \frac{292}{300} \right) - \left( \frac{11.2}{10.39 \text{ mL}} \right) \left( \frac{9.746 \text{ g/L}}{10.39 \text{ g/L}} \right)}{\left( \frac{5.3 \text{ mL}}{3.0 \text{ mL}} \right) \left( \frac{600 \text{ mL}}{1.0 \text{ L}} \right)} \times 100 =$$

= 89.6984%

*J. H. Landrich*  
8-23-90

Ion Chromatograph Analysis on the Water Digestion - Fluoride Analysis

Serial No. F 438.-7371		Sample Point SEGMENT-W		Date 11-30-89	Time Issued 8: 9	Priority 18
Determination F	Method/Standard LA-533-105	Result Units PPM	Charge Code WB75L	Reruns 0		
Sample Size ? Direct		Customer ID 100-10				
Remarks, Calculations, Results: REAGENT BLANK						
<b>RERUN</b>						
↔ ppm						
Analyst - 1 6B107/reu .5	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs		
Date 4/12/90	Time Completed 4/19/90	Lab Unit Mgr BB				
SA-4800-041 (R-10-83)						

Serial No. F 574.-7371		Sample Point SEGMENT-O		Date 12- 1-89	Time Issued 11:36	Priority 19
Determination F	Method/Standard LA-533-105	Result Units % RECOVERY	Charge Code WB75L	Reruns 0		
Sample Size 100-10		Customer ID				
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID 6C71-A0						
<b>RERUN</b>						
55.1 / 60.0      91.8%						
Analyst - 1 6B107/reu .5	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs		
Date 4/12/90	Time Completed 4/19/90	Lab Unit Mgr BB				
SA-4800-051 (R-10-83)						

Total Organic Carbon Analysis on the Water Digestion

Serial No. F 476.-7126	Sample Point SEGMENT-M	Date 11-30-89	Time Issued 8:36	Priority 19
Determination TOC	Method/Standard LA-344-105	Result Units G/L	Charge Code WB75L	Refuse 0
Sample Size $? 1\text{ml} + 100\mu\text{l}, 5\text{m}\text{H}_2\text{SO}_4 - 200\mu\text{l}$	Customer ID <b>089072</b> <i>7.15<sup>-3</sup> g/l C</i>			
Remarks, Calculations, Results: DUPLICATE SAMPLE				
Analyst - 1 <b>80028</b> <i>El Ch</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>Recount</i>
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-15-90	Time Completed <i>OK</i>	Lab. Unit Mgr	<i>bX</i>	
54-0800-061 (R-10-63)				

Serial No. F 478.-7526	Sample Point SEGMENT-O	Date 11-30-89	Time Issued 8:36	Priority 19
Determination TOC	Method/Standard LA-344-105	Result Units % RECOVERY	Charge Code WB75L	Refuse 0
Sample Size $? 200\mu\text{l} - 2\text{ml} - 200\mu\text{l}$	Customer ID <b>089072</b> <i>2.900/3.000</i>			
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID <u>70C11C</u> <i>2.900/3.000</i>				
Analyst - 1 <b>80028</b> <i>El Ch</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>Recount</i>
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-15-90	Time Completed <i>OK</i>	Lab. Unit Mgr	<i>bX</i>	<i>SB</i>
54-0800-061 (R-10-63)				

Serial No. F 486.-7326	Sample Point SEGMENT-W	Date 11-30-89	Time Issued 8:38	Priority 18
Determination TOC	Method/Standard LA-344-105	Result Units G/L	Charge Code WB75L	Refuse 0
Sample Size $? 200\mu\text{l}$	Customer ID <b>089072</b> <i>2.6 mg/l</i>			
Remarks, Calculations, Results: REAGENT BLANK				
Analyst - 1 <b>80028</b> <i>El Ch</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>Recount</i>
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-15-90	Time Completed <i>OK</i>	Lab. Unit Mgr	<i>bX</i>	
54-0800-061 (R-10-63)				

Serial No. F 475.-7026	Sample Point SEGMENT-L	Date 11-30-89	Time Issued 8:35	Priority 19
Determination TOC	Method/Standard LA-344-105	Result Units G/L	Charge Code WB75L	Refuse 0
Sample Size $? 1\text{ml} + 100\mu\text{l}, 5\text{m}\text{H}_2\text{SO}_4 - 200\mu\text{l}$	Customer ID <b>089072</b> <i>8.80<sup>-3</sup> g/l C</i>			
Remarks, Calculations, Results:				
Analyst - 1 <b>80028</b> <i>El Ch</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>Recount</i>
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-15-90	Time Completed <i>OK</i>	Lab. Unit Mgr	<i>bX</i>	
54-0800-061 (R-10-63)				

Total Organic Carbon Analysis on the Water Digestion

Serial No.	Sample Point		Date	Time Issued	Priority
F 477.-7226	SEGMENT-N		11-30-89	8:28	19
Determination	Method/Standard	Result Units	Charge Code	Run No.	
TOC	LA-344-105	% RECOVERY	WB75L	0	
Sample Size				Customer ID	
? 200uL + 100uL 5m H <sub>2</sub> SO <sub>4</sub> - 200uL				C89072	
Remarks, Calculations, Results: SPIKE SAMPLE SPIKE ID 70C11 SEE Reverse SPIKE VOLUME 200uL Side * see back of card 96.28%					
$\frac{(119.8 - 24) - (4.2 - 2.4)}{119.7} \times 100 = 97.5\% \text{ RMS}$					
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
70022				Ed Cohn	
Hrs	Hrs	Hrs	Hrs	Hrs	
Ed Cohn					
Date	Time Completed	Lab Unit Mgr			
3-15-90		OK	OK	OK	

54-6800-081 (R-10-83)

Serial No.	Sample Point		Date	Time Issued	Priority
F 474.-7526	SEGMENT-K		11-30-89	8:35	19
Determination	Method/Standard	Result Units	Charge Code	Run No.	
TOC	LA-344-105	% RECOVERY	WB75L	0	
Sample Size				Customer ID	
? 200uL - 20uL - 200uL				C89072	
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID 70C11C					
$2.926 / 3.000 = 97.5\% \text{ RMS}$					
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
70022				Ed Cohn	
Hrs	Hrs	Hrs	Hrs	Hrs	
Ed Cohn					
Date	Time Completed	Lab Unit Mgr			
3-15-90		OK	OK	OK	

54-6800-081 (R-10-83)

Total Organic Carbon Analysis on the Water Digestion

FO477 - 7226

F477 TOC spike

$$\frac{\left[ 177.2 \text{ mg} - (1.6 \text{ mg}) \left( \frac{10.1\%}{7.81\%} \right) \right] 100}{\left( \frac{300 \text{ mg}}{.553\text{L}} \right) (.2 \text{ ml})} = 96.28\% \text{ rec}$$

R E Brant  
8/29/90

$$\text{TOC} = 1.459 \text{ g/L} \approx 1500 \text{ mg/L}$$

$$(1500 \text{ mg/L}) (.2 \text{ ml}) = 300 \text{ mg}$$

Acid Digestion

Serial No. <b>F 480.-8000</b>	Sample Point <b>SEGMENT-Q</b>	Date <b>11-30-89</b>	Time Issued <b>8:37</b>	Priority <b>23</b>
Determination <b>ACD-DGST</b>	Method/Standard <b>LA-505-159</b>	Result Units <b>G/L</b>	Charge Code <b>WB75L</b>	Re runs <b>0</b>
Sample Size ?	Customer ID <b>89072</b>			
Remarks, Calculations, Results: GRAMS SAMPLE <u>0.4820</u> VOLUME ON COMPLETION <u>50ml</u>  <i>4.6 - 3 g/ml = 8</i> <i>9.6 - 3 g/l</i> <b>W/HC</b> <b># 365 3.60g</b> SEQUENCE #: 115 WT 1: 82.5495 WT 2: 82.5715 NET WEIGHT:				
Analyst -1 <b>65283</b>	Analyst -2	Analyst -3	----- B-4820 GRAMS 83-86/89 8-10:37:53	
<b>J White</b>	Hrs		Hrs	Hrs
Date <b>3-7-90</b>	Time Completed <b>3/8/1124</b>	Lab Unit Mgr <b>CJL</b>	<b>msl Sifra</b>	

Serial No. <b>F 482.-8200</b>	Sample Point <b>SEGMENT-S</b>	Date <b>11-30-89</b>	Time Issued <b>8:37</b>	Priority <b>23</b>
Determination <b>ACD-DGST</b>	Method/Standard <b>LA-505-159</b>	Result Units <b>% RECOVERY</b>	Charge Code <b>WB75L</b>	Re runs <b>0</b>
Sample Size ?	Customer ID <b>089072</b>			
Remarks, Calculations, Results: SPIKED ANALYSIS GRAMS SAMPLE <u>0.3935</u> VOLUME ON COMPLETION <u>50ml</u> VOLUME SPIKE <u>5ml + 5ml</u> SPIKE ID/ <u>046150 + 5A641</u>  <b>7.87 - 3</b> <b>7.87g/l 5ml = 7.87g</b> SEQUENCE #: 117 WT 1: 82.5494 WT 2: 82.5719 NET WEIGHT:				
Analyst -1 <b>65283</b>	Analyst -2	Analyst -3	----- B-4820 GRAMS 83-86/89 8-10:36:24	
<b>J White</b>	Hrs		Hrs	Hrs
Date <b>3-7-90</b>	Time Completed <b>3/8/1120</b>	Lab Unit Mgr <b>CJL</b>	<b>had</b>	

Serial No. <b>F 487.-8300</b>	Sample Point <b>SEGMENT-X</b>	Date <b>11-30-89</b>	Time Issued <b>8:38</b>	Priority <b>18</b>
Determination <b>ACD-DGST</b>	Method/Standard <b>LA-505-159</b>	Result Units <b>G/L</b>	Charge Code <b>WB75L</b>	Re runs <b>0</b>
Sample Size ?	Customer ID <b>089072</b>			
Remarks, Calculations, Results: REAGENT BLANK VOLUME ON COMPLETION <u>50ml</u>  <b>complete</b>				
Analyst -1 <b>65283</b>	Analyst -2	Analyst -3	Analyst -4	Analyst -5
Hrs	Hrs	Hrs	Hrs	Hrs
<b>J White</b>				
Date <b>3-7-90</b>	Time Completed <b>3/8/1123</b>	Lab Unit Mgr <b>CJL</b>	<b>msl Sifra</b>	

Serial No. <b>F 481.-8100</b>	Sample Point <b>SEGMENT-R</b>	Date <b>11-30-89</b>	Time Issued <b>8:37</b>	Priority <b>23</b>
Determination <b>ACD-DGST</b>	Method/Standard <b>LA-505-159</b>	Result Units <b>G/L</b>	Charge Code <b>WB75L</b>	Re runs <b>0</b>
Sample Size ?	Customer ID -----			
Remarks, Calculations, Results: DUPLICATE ANALYSIS GRAMS SAMPLE <u>0.5740</u> VOLUME ON COMPLETION <u>50ml</u>  <b>7.88 - 3</b> <b>7.88g/l 5ml = 7.88g</b> SEQUENCE #: 16 WT 1: 82.5814 WT 2: 82.5954 NET WEIGHT:				
Analyst -1 <b>65283</b>	Analyst -2	Analyst -3	----- B-4820 GRAMS 83-86/89 8-11:03:36	
<b>J White</b>	Hrs		Hrs	Hrs
Date <b>3-7-90</b>	Time Completed <b>3/8/1120</b>	Lab Unit Mgr <b>CJL</b>	<b>msl Sifra</b>	

## ICP Analysis

Serial No. F 479.-8550	Sample Point SEGMENT-P		Date 11-30-89	Time Issued 8:37	Priority 23
Determination ICP	Method/Standard LA-505-151	Result Units % RECOVERY	Charge Code WB75L	Reruns 0	
Sample Size ?	Customer ID <b>089072</b>				
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID  78C11F 82B3BC 77C11F					
Analyst - 1 <i>65283</i>	Analyst - 2 Hrs <i>J. White</i>	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs	
Date 3-31-90	Time Completed <i>4P</i>	Lab Unit Mgr <i>dk</i>			
54-6800-081 (R-10-83)					

Serial No. F 481.-8150	Sample Point SEGMENT-R		Date 11-30-89	Time Issued 8:37	Priority 23
Determination ICP	Method/Standard LA-505-151	Result Units PPM	Charge Code WB75L	Reruns 0	
Sample Size ?	Customer ID <b>089072</b>				
Remarks, Calculations, Results: DUPLICATE SAMPLE					
Analyst - 1 <i>65283</i>	Analyst - 2 Hrs <i>J. White</i>	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs	
Date 3-31-90	Time Completed <i>xx</i>	Lab Unit Mgr <i>dk</i>			
54-6800-081 (R-10-83)					

Serial No. F 480.-8050	Sample Point SEGMENT-Q		Date 11-30-89	Time Issued 8:37	Priority 23
Determination ICP	Method/Standard LA-505-151	Result Units PPM	Charge Code WB75L	Reruns 0	
Sample Size ?	Customer ID <b>089072</b>				
Remarks, Calculations, Results:					
Analyst - 1 <i>65283</i>	Analyst - 2 Hrs <i>J. White</i>	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs	
Date 3-31-90	Time Completed <i>xx</i>	Lab Unit Mgr <i>dk</i>			
54-6800-081 (R-10-83)					

Serial No. F 487.-8350	Sample Point SEGMENT-X		Date 11-30-89	Time Issued 8:38	Priority 18
Determination ICP	Method/Standard LA-505-151	Result Units PPM	Charge Code WB75L	Reruns 0	
Sample Size ?	Customer ID <b>089072</b>				
Remarks, Calculations, Results: REAGENT BLANK					
Analyst - 1 <i>65283</i>	Analyst - 2 Hrs <i>J. White</i>	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs	
Date 3-31-90	Time Completed <i>xx</i>	Lab Unit Mgr <i>dk</i>			
54-6800-081 (R-10-83)					

ICP Analysis

Serial No. F 483.-8550		Sample Point SEGMENT-T		Date 11-30-89	Time Issued 8:37	Priority 23
Determination ICP	Method/Standard LA-505-151	Result Units % RECOVERY	Charge Code WB75L	Reruns 0		
Sample Size ?			Customer ID <b>689072</b>			
Remarks, Calculations, Results: LMCS CHECK SAMPLE LMCS ID _____  78C11F 82B38C 77C11F						
Analyst -1 <i>C5283</i>	Analyst -2	Analyst -3	Analyst -4	Analyst -5		
Hrs <i>J White</i>	Hrs	Hrs	Hrs	Hrs		
Date 3-31-90	Time Completed	Lab Unit Mgr <i>OK</i>	<i>OK</i>			
SA-6800-081 (R-10-83)						

Serial No. F 482.-8250		Sample Point SEGMENT-S		Date 11-30-89	Time Issued 8:37	Priority 23
Determination ICP	Method/Standard LA-505-151	Result Units PPM	Charge Code WB75L	Reruns 0		
Sample Size ?			Customer ID <b>689072</b>			
Remarks, Calculations, Results: SPIKE SAMPLE SPIKE ID _____ SPIKE VOLUME _____						
Analyst -1 <i>165283</i>	Analyst -2	Analyst -3	Analyst -4	Analyst -5		
Hrs <i>J White</i>	Hrs	Hrs	Hrs	Hrs		
Date 3-31-90	Time Completed	Lab Unit Mgr <i>OK</i>	<i>OK</i>			
SA-6800-081 (R-10-83)						

**APPENDIX B**

**ANALYTICAL DETECTION LIMITS**

**SINGLE SHELL TANK PROJECT**  
**Analytical Detection Limits**  
**October 12, 1990**

The following detection limits are derived on ideal matrices. These values were derived by using either calibration standards or pure matrix standards. Detection limits on actual single shell tank samples are likely to be much higher. No information regarding procedure detection limits is available for procedures not listed in this report.

**Procedure      LA-355-131**

Arsenic Analysis by Hydride Generation Atomic Absorption

Detection Limit    =    0.005 ppm in solution

Typical sample dilution for the Fusion Dissolution was 0.0025g/mL.

Typical sample dilution for the Water Digestion was    0.010g/mL.

Typical sample dilution for the acid Digestion was    0.010g/mL.

**Procedure      LA-325-102**

Mercury Analysis by Atomic Absorption Manual Cold Vapor Technique

Detection Limit    =    0.002 ppm in solution

Typical sample dilution for the Fusion Dissolution was 0.0025g/mL.

Typical sample dilution for the Water Digestion was    0.010g/mL.

Typical sample dilution for the acid Digestion was    0.010g/mL.

Solids were analyzed directly.

**Procedure      LA-362-131**

Selenium Analysis by Hydride Generation Atomic Absorption

Detection Limit    =    0.005 ppm in solution

Typical sample dilution for the Fusion Dissolution was 0.0025g/mL.

Typical sample dilution for the Water Digestion was    0.010g/mL.

Typical sample dilution for the acid Digestion was    0.010g/mL.

**Procedure LA-533-105**  
Anion Analysis on Dionex Model 4000i

Typical sample dilution was 0.000099g/mL

**Fluoride**

Detection Limit in solution = 0.09 ppm.

**Chloride**

Detection Limit in solution = 0.04 ppm.

**Nitrate**

Detection Limit in solution = 0.24 ppm.

**Phosphate**

Detection Limit in solution = 0.13 ppm.

**Sulfate**

Detection Limit in solution = 0.13 ppm.

**Procedure LA-622-102**

Determination of Carbonate in Solutions by Coulometry

Detection Limit = 5 ppm in solution

Typical sample dilution was 0.01g/mL

**Procedure LA-344-105**

Total Organic Carbon

Determination of Carbon Insolation by Combustion and Coulometry

Detection Limit = 5.5 ppm in solution

Typical sample dilution was 0.01g/mL

**Procedure            LA-505-151**

Inductively Coupled Plasma (ICP) Emission Spectrometer Operations  
and Analysis

Typical sample dilution for the Fusion Dissolution was  
0.00019g/mL.

Typical sample dilution for the Water Digestion was  
0.000476g/mL.

Typical sample dilution for the acid Digestion was  
0.000476g/mL.

Instrument Detection Limit ppm.

Aluminum	0.0745	Antimony	0.1424
Arsenic	0.0223	Barium	0.0026
Beryllium	0.0006	Bismuth	0.0839
Boron	0.0083	Cadmium	0.0039
Calcium	0.0002	Cerium	0.1359
Chromium	0.0039	Cobalt	0.0246
Copper	0.0158	Europium	0.0024
Iron	0.0073	Lanthanum	0.0141
Lead	0.0273	Lithium	0.0032
Magnesium	0.0001	Manganese	0.0011
Mercury	0.0036	Molybdenum	0.0049
Neodymium	0.2130	Nickel	0.0147
Phosphorous	0.0308	Potassium	0.2122
Samarium	0.1525	Selenium	0.0631
Silicon	0.0314	Silver	0.0183
Sodium	0.0483	Strontium	0.0010
Sulfur	0.0163	Tantalum	0.0273
Thallium	0.0646	Thorium	0.0122
Tin	0.0144	Titanium	0.0035
Tungsten	0.0273	Uranium	1.1405
Vanadium	0.0186	Zinc	0.0017
Zirconium	0.0141		